





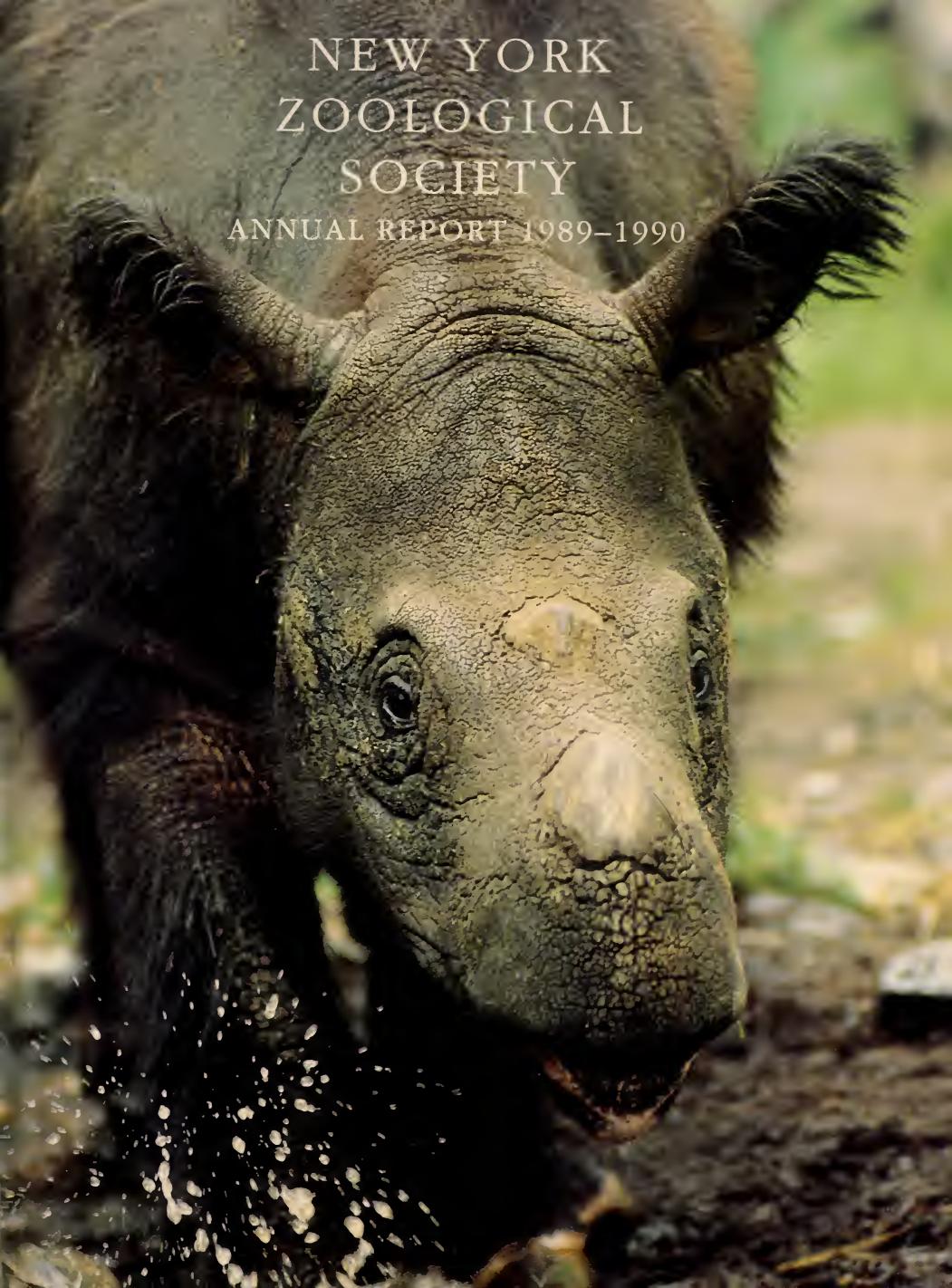
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NEW YORK  
ZOOLOGICAL  
SOCIETY

ANNUAL REPORT 1989-1990



To Sustain  
Biological Divers

To Teach Ecolog

To Inspire Care

Cover: Rapunzel,  
the Sumatran  
rhino.

Baboon Reserve  
and African  
Market at the  
Bronx Zoo.

The City of New York, through its Department of Cultural Affairs, provides annual operating support for the Bronx Zoo and the New York Aquarium, both of which occupy City-owned buildings on City-owned property. The City's Department of Parks and Recreation provides funding for the Central Park Zoo.

The Society also receives funds annually from the Natural Heritage Trust, a program of the New York State Office of Parks and Recreation.

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## REPORT OF THE PRESIDENT

National enthusiasm for the 20th anniversary of Earth Day this year seemed to indicate an increasing level of public awareness about the environment's precarious status. The Society played its role with a seven-week program of weekend events at the Bronx Zoo, generously sponsored by Kal-Kan Foods, and timely activities at the New York Aquarium and Central Park Zoo. Of course, the Society plays a role every day of the year in the battle for knowledge and hope.

Many areas of our work—in species survival, wild animal nutrition, genetics, ecological education, exhibition design, conservation fieldwork and planning, computer applications to wildlife study and management—have grown almost beyond recognition in recent years. There is no lack of ideas, talent, or commitment to continue this growth. The task now is to transform marginally supported good works on behalf of nature into real philosophical and funding priorities.

An important part of the equation is government funding, which unfortunately has recently been undermined by economic conditions. Operating support for the Bronx Zoo and New York Aquarium from the City of New York in 1990, through the Department of Cultural Affairs, totaled \$9,779,472. The Central Park Zoo received \$2,694,689 through the Department of Parks and Recreation. New York State, primarily through the Natural Heritage Trust, allocated \$2,139,053 for the Zoo and Aquarium. Federal grants, from the U.S. Agency for International Development (USAID), Institute of Museum Services, the Department of Education's National Diffusion Network, the National Science Foundation, and the National Park Service, totaled \$730,947.

There are encouraging signs, however, that the ranks and sophistication of "those who care about tomorrow" are growing. The Society now has about 90,000 active contributors, including 74,000 NYZS and Wildlife Conservation International members. WCI's donor base continues to increase rapidly as its vital work around the world becomes better known. The Society's total for private donations during the year—from dues, gifts, pledges, and bequests—was

\$13,357,945, representing a rise of 11 percent over the previous year.

Some of our most crucial and innovative programs received the attention of major donors. The Charles Zarkin Memorial Foundation made a five-year \$250,000 pledge to the Zoo Education Department's Teacher Training Program, which will significantly expand the attention of middle and high school science curriculums to conservation biology. Training for scientists in the developing world was funded again by a \$280,000 grant to WCI from the Pew Charitable Trusts. The Hayden Foundation gave \$160,000 for new exhibits in the Children's Zoo, and The Perkin Fund gave \$150,000 to the Wild Animal Nutrition program. A donation of \$200,000 from the Robert Wood Johnson Charitable Trust to WCI was designated in part for the work of Terese and John Hart in Zaire. And the \$300.74 raised by 10-year-old Joshua Boissevain in Boulder, Colorado, was given with great conviction to the African Elephant Campaign.

In Adair Beutel's first year as president, the Women's Committee raised funds for the capital campaign at its annual dinner event at the Central Park Zoo on May 23, 1990. In the Junior Committee's second year, 688 people attended its fund-raising effort for WCI, also held at the Central Park Zoo, as was the third Corporate Benefit on June 7, chaired by Mrs. Saul Steinberg, Mrs. Preston Robert Tisch, and Richard E. Snyder, Chairman and CEO of Simon & Schuster. The dinner raised \$200,000 for WCI and environmental education, and honored Business Committee Chairman Richard A. Voell, President and CEO of The Rockefeller Group, with the 1990 Distinguished Leadership Award.

Under a leadership committee chaired by Mrs. Gordon B. Pattee, approximately \$14 million has been raised or pledged in the current capital campaign through June 30. Major gifts were received from The Schiff Family, The Irwin Family, Edith McBean, C. Sims Farr, Guy Cary, and Mr. and Mrs. Edgar Cullman. Mr. and Mrs. Pattee and Anne Pattee gave \$1 million to the



African Elephant Protection Plan of the Crisis Fund for Vanishing Wildlife. The Prospect Hill Foundation contributed \$250,000 and Bradley Goldberg \$150,000 to the Fund. Half of ITT's gift of \$1 million was designated for the new Baboon Reserve and African Market at the Bronx Zoo. Shirley Katzenbach gave \$500,000 for the Animal Health Center, including a new research suite to be named in tribute to the late Dr. Emil Dolensek, who died on February 7, 1990 after 20 remarkable years as the Society's chief veterinarian.

Dr. Dolensek's death was indeed a shock to everyone who knew and worked with him. A formidable figure in the Society's history and a source of great strength and pride, he developed the most advanced and dedicated animal health department in the country, culminating in the creation of the modern Animal Health Center in 1985. We also mourn the passing of Dr. Ross F. Nigrelli, the marine biologist and world-renowned expert on fish diseases who directed the Osborn Laboratories of Marine Sciences from 1964 to 1973 and the New York Aquarium from 1966 to 1970, and Charles B. Driscoll, the Bronx Zoo's supervisor of construction and maintenance from 1956 to 1976.

Several changes were made in the Society's boards during the year. The Honorary Trustees were redesignated Life Trustees to better reflect their status and long-term contributions to the Society. Augustus G. Paine, who had served effectively on many committees since becoming a Trustee in 1965, was named a Life Trustee. The Board of Trustees itself was expanded to 45 members. Several new members were appointed,

including Dr. Roscoe C. Browne, Jr., President of Bronx Community College; Robert Esnard, president of the Donald Zucker Company and former deputy mayor for policy and physical development under Mayor Edward I. Koch; Alberto M. Parracchini, chairman of the combined Banco Popular and Banco de Ponce; Mrs. Richard B. Tweedy, a strong supporter of Wildlife Conservation International who served on the Board of Advisors; and Richard A. Voell, president and chief executive officer of The Rockefeller Group, chairman of the Society's Business Committee, and also a former advisor. Named to the Board of Advisors were four active friends and supporters of the Society: Mrs. Rand V. Araskog, Mrs. John H. Culbertson, C. Walter Nichols, 3rd, and Mrs. Leonard Stern.

Howard Phipps, Jr.  
President

## REPORT OF THE GENERAL DIRECTOR

### Instability And Change

Stability is no more possible in a zoological society devoted to living creatures than is stasis in natural ecosystems; there is little "balance of nature" in nature. Eras of equilibrium are rare, periods of change pervasive—and response is essential. The response of a public not-for-profit institution to change is judged by its effectiveness in fulfilling its mission, the relevance of that mission, and especially by the quality of its initiatives. Inevitably, it is also measured by every applicable adjective almost anyone can think of—including "good" and "bad"—and even by that battered descriptive, "progress."

New initiatives are a telling way of gauging the progress—of calibrating achievement. The Zoological Society's past year has been extraordinarily telling, overseas and at home. Here is an NYZS sampler:

Overseas: A foundation was laid for the creation of the largest natural preserve on Earth—the Chang Tang on the Tibetan Plateau; Middle Cay, a critically positioned island in Glover's Reef off Belize, was acquired to help protect the finest example of a coral reef in the western hemisphere; the birth of Fundacion Patagonia Natural, a wholly new and already effective local wildlife conservation organization, was midwifed in Patagonia; WCI scientists took the lead in a series of fact-finding studies and an education campaign that finally has braked the international elephant ivory trade; the Guam rail, extinct in nature, was reintroduced from zoo stocks to an island in the Pacific; Venezuela's important Caripe oilbird sanctuary was enlarged as a result of WCI research and promotion; a wholly new concept in global conservation action was introduced with the creation of an International Field Veterinarian post, and by the immediately productive actions of its first incumbent. These are a few of the year's efforts to save biological diversity.

At home: Fresh standards of interpretive animal exhibition were set with the innovative new Baboon Reserve and African Market at the Bronx Zoo; ground was broken for the vast Sea Cliffs complex for marine mammals and penguins; and work began on the City's Prospect Park Zoo, redesigned and ultimately to be

run by the Society. Nutrition research threw light on the needs of rhinos, frugivorous birds, penguins, and hoatzins; genetics research produced fascinating analyses of Sika deer subspecies and the relationship between gharials and false gharials; an ambitious program of biotelemetry research was planned; and animal identification techniques leapt forward through the use of transponders. Curatorial ingenuity and hard work led to the first successful exhibition of leaf-eating hoatzins; to the first captive propagation of giant endangered freshwater turtles known as batagurs; and to the acquisition of a Sumatran hairy rhinoceros as part of a collaborative effort with the Indonesian government and three other American zoos to save this rare creature, believed to number less than 900 in nature. The Society's breeding programs produced nearly 2,000 offspring during the year, including four baby gorillas!

And, on January 1, 1990, the Society's magazine, *Animal Kingdom*, appeared as a totally redesigned publication called, and devoted to, *Wildlife Conservation*.

### Institutional Ecology And Caring For Wildlife

A widespread educational failure is evident in the still common public belief that a vast untamed wilderness exists somewhere "out there," that there are places where wild animals can get along just fine if only human beings will leave them alone. In a time of the fastest and greatest extinction of species since the Cretaceous, this idea of distant wilderness is reminiscent of the Flat Earth Society's concept of the solar system, and it is sad. The expectation that fragmentary human leavings of nature will prosper under a policy of benevolent neglect is simply uninformed.

Here in the U.S., for example, Everglades National Park was dedicated in 1947 primarily because of the year-round presence of "the most glorious assemblage of wading birds on the North American continent." Since then, the number of waders has declined nearly 90 percent! Figures for African preserves are comparable, for Asian ones much worse. Active, hands-on restoration, and understanding care for nature must replace just plain dedicating it. In the next two



decades virtually all large African and Asian mammals are expected to become extinct except for the tiny populations in reserves and zoos.

Setting aside wild lands is not enough to assure that wildlife will survive. Such preserves are never wholly independent ecosystems and are especially subject to natural instability and processes of change. The challenge is clear, and powerfully coherent new relationships are being forged to meet it by ecologists, ethologists, geographers, educators, zoological curators, veterinarians, biopoliticians, artists, and writers. There is a new convergence in conservation methodology. Not by chance, the New York Zoological Society employs, or is guided by, all these "species" of people, a cadre capable of caring and inspiring concern for nature while developing new scientific understandings. the results of this institutional ecology, with its unusual panoply of professions, appear throughout this report.

## Priorities

Outward-looking institutional introspection (though it sounds like a phrase created by a collaboration of Warren Harding and Woody Allen) describes the intensive planning process in which NYZS trustees and staff have been engaged during the past few years. It was usually posed as a question: "What is happening out there, what have we got in here, and how can we help?"

In essence, the Society's leaders have said, "We have no higher priority than the preservation of life." This framework has guided our efforts in planning an interlocking series of programs and projects, direct in

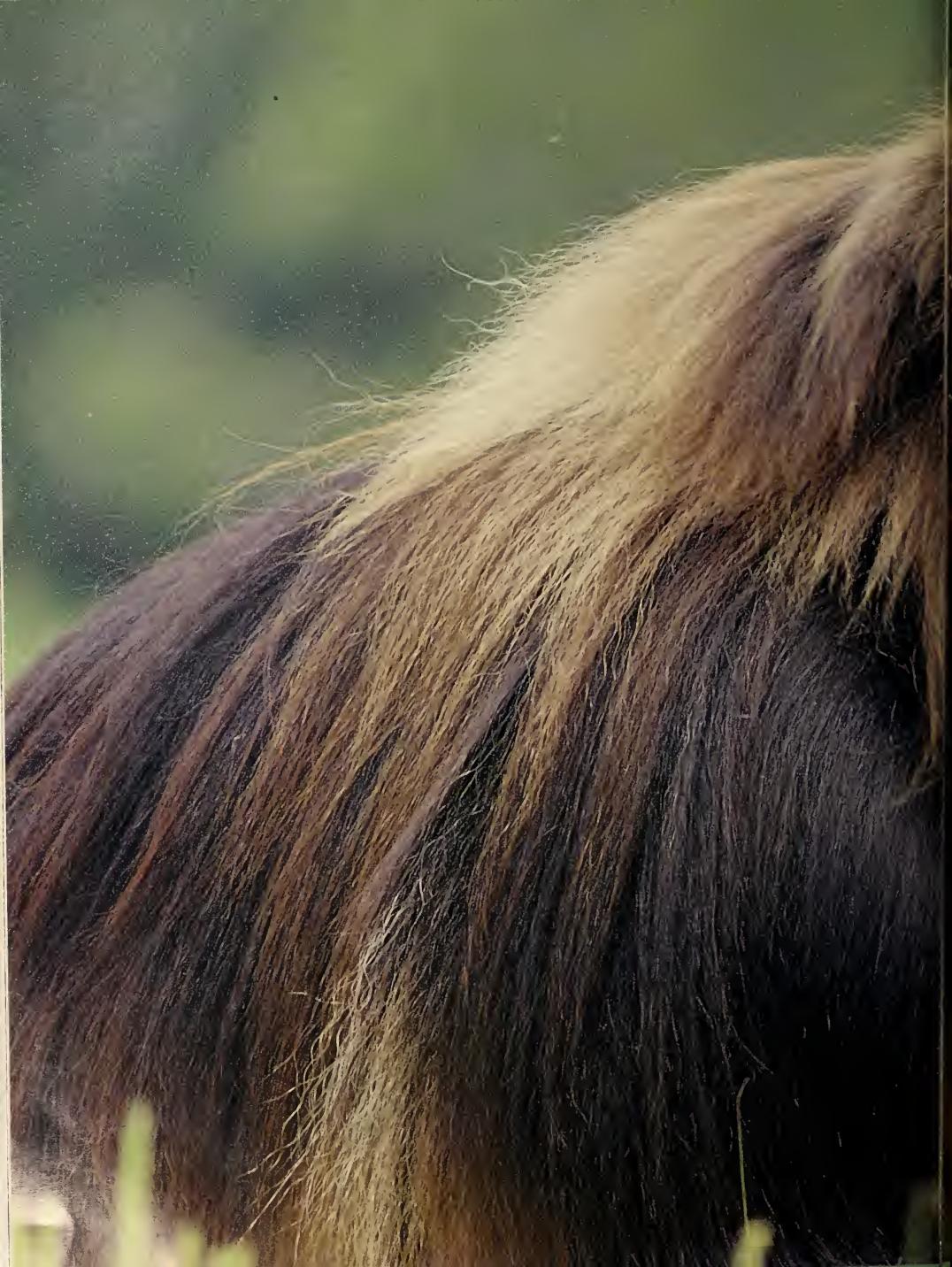
their application to nature conservation, or necessarily indirect in support of programs that are. They range from efforts to help sustain faltering wildlife refuges around the world to breeding programs for species that have temporarily lost their homes in nature; from teaching the life-sustaining facts of ecology to the next generation of Americans to training the current generation of conservationists and decision-makers in less developed countries. They give high priority to getting the facts and resolving the problems in human-wildlife conflicts, and they do not overlook the essential task of helping to make the Society's home town a better place to live.

## Zoo Vision—A Conservation Machine

In mechanistic terms, the Zoological Society is becoming a kind of conservation machine, an engine for research, education, and environmental action directed toward the preservation of nature and wild creatures for future generations. We are seeking viable alternatives to extinction.

This vision energizes the Society. Its institutions in Brooklyn, the Bronx, Manhattan, and Georgia are linked to more than 130 WCI field conservation projects in 45 developing nations, and these provide special dimensions of depth, insight, and outreach. The care of thousands of living creatures with finite life-spans, from rhinos and gorillas to tanagers and clownfish, their unceasing change and essential propagation, bring the pressures of time and the trends of instability into sharp focus.

William Conway  
General Director





# SANCTUARIES FOR WILDLIFE

In New York City and on St. Catherines Island, Georgia, the New York Zoological Society sustains more than 9,000 animals of 1,000 species, many of them threatened or endangered in the wild. The role of the Society's public wildlife facilities—now including the Bronx Zoo, the New York Aquarium, the Central Park Zoo, and the Wildlife Survival Center—has changed radically in this century as natural habitats have dwindled. More than ever, the zoos and aquarium are "sanctuaries" that protect wild creatures from ecological destruction, and even save some from total extinction. Last year, nearly 2,000 mammals, birds, amphibians, reptiles, and fishes of 170 species were born or hatched in the Society's wildlife collections, many as part of interzoo breeding programs. Crucial studies were conducted in wild animal nutrition, zoological medicine, genetics, biotelemetry, animal behavior, animal management, and reproductive biology. Major new exhibition and breeding centers, including Baboon Reserve at the Bronx Zoo and Sea Cliffs at the Aquarium, were being constructed. Addressing global problems, the zoos and aquarium are increasingly linked to the Society's international field program, Wildlife Conservation International, and to its wide-ranging educational programs, described later in this report.

## SANCTUARIES FOR WILDLIFE



### Bronx Zoo Mammals

On a hot, humid afternoon in November, on the other side of the globe, General Curator James Doherty, Chief Veterinarian Robert Cook, and Collections Manager Marietta Kalk eagerly stepped out of a plane in Pekinbaru, Sumatra, to be greeted by Sukianto Loosli and Tony Parkinson. Tony is a well-known wildlife conservationist. Sukianto, Tony's assistant, supervises operations in the field and at a base camp in Dalu Dalu, Sumatra. The purpose of this trek was to receive and escort back across the world one of the rare and almost mythical Sumatran hairy rhinos. Four years ago, the Bronx, Los Angeles, San Diego, and Cincinnati zoos established a captive-breeding agreement with the Indonesian government. Thus the Sumatran Rhino Trust was created to insure the survival of this rapidly disappearing creature.

The return trip by truck, boat, and plane took several days. After a stopover at the Los Angeles Zoo, Rapunzel arrived at her new home at the Keith W. Johnson Zoo Center on May 16. In nature, Sumatran rhinos are shy and elusive. However, they seem to

**The Reserve's two Gelada troops in a confrontational mode.**

---

readily accept a captive environment and actually become quite familiar with their caretakers.

Recent estimates place the number of these animals remaining in the wild at 483–877 individuals. There are now 18 Sumatran rhinos in captivity, including Rapunzel, who awaits the arrival of a mate to begin her part in the breeding program.

Among Curator Doherty's many projects this past year was the planning of one of the most spectacular primate exhibits to be found in any zoological park. The new Baboon Reserve features the gelada, which is found only in the highlands of Ethiopia. This robustly built creature is rather striking for many reasons. The barrel-chested larger males have long, flowing, cape-like hair covering their shoulders. When an animal becomes excited, angry, or sexually aroused, a hairless hourglass-shaped "design" on its chest changes to vivid red. White eyelids are displayed as a sign of aggression. The females also show chest color change when

aroused. Two troops of these animals, each with a dominant male and their respective harems, inhabit the exhibit with another very impressive creature—the magnificent Nubian ibex. These large-bodied, goatlike ungulates, most notable for their massive, curved horns, move up and down the hillsides occasionally interacting with each troop of baboons. Cape teal and Abyssinian blue-winged geese take advantage of the winding waterway beneath the hilly terrain.

Finding enough baboons for this large exhibit was no easy task. Mr. Doherty managed to acquire animals from zoos in Germany, Switzerland, Australia, Brazil, and several U.S. zoological institutions. The Cincinnati Zoo provided an established troop of two males and six females. The second troop was created by Collections Manager Fred Sterling and a number of keepers over a period of time in an off-exhibit area. Introducing unfamiliar animals to each other was a long and complicated procedure, somewhat more involved than the "handshake and hello" method seen in *Homo sapiens*. The final result was a troop of one male and nine females, bringing the total of two troops to 18 animals.

An existing exhibition, the World of Darkness, underwent a major renovation in spring 1990. Five small arboreal exhibits became one large, exciting, mixed-species exhibit. The unusual prehensile-tailed tree porcupine from South America carefully and deliberately moves from one branch to another while a pair of agile douroucoulis, or owl monkeys, leap back and forth. Other new species in the World of Darkness include slender lorises, Madagascan hedgehogs, tenrecs, scorpions, and vampire bats.

Fred Koontz, who was promoted to curator during the year, recently traveled to Cameroon to meet with Wildlife Conservation International's James Powell in Korup National Park. Dr. Koontz assisted in developing a protocol for censusing various species found in this remote ecosystem, particularly forest elephants, which, unlike elephants in other parts of Africa, still appear to exist in significant numbers.

In May, Mammal Supervisor Claudia Wilson escorted



Rapunzel explores her new surroundings at Zoo Center.

---

four California sea lions to the Soviet Union, where they are now living at the Moscow Zoo. Escort is required by international law governing the transportation of marine mammals. Snow leopards were sent to zoos in Czechoslovakia, Ireland, and Cleveland, Ohio.

Important mammal births were recorded for babirusa, red panda, Mongolian wild horse, lowland gorilla, snow leopard, giraffe, silvery marmoset, Indian rhino, common marmoset, silvered leaf-monkey, Pere David deer, and proboscis monkey.

Margaret Gavlik was promoted to assistant supervisor, and supervisor Patrick Thomas became part of the New York Zoological Society Doctoral Program.

## SANCTUARIES FOR WILDLIFE



Baby slow loris, born on  
September 20, 1989.

Remains of an elephant killed by  
poachers in Kenya.



### Bronx Zoo Birds

1990 saw the success of a project first conceived by William Beebe many years ago: the collection, importation, and exhibition of hoatzins. These strange, primitive looking birds, now threatened by the destruction of their rain-forest habitat in South America, are highly specialized, and subsist entirely on a diet of leaves. Young hoatzins stay with their parents for as many as two years, helping to rear younger siblings. Chicks are slow-growing, unable to fly for several months. To escape predators, they dive into the water, over which the nest is always built, then clamber back to the nest with special wing claws.

These unusual physiological and behavioral characteristics have made it difficult to keep and breed hoatzins in captivity. A better understanding of the species was achieved through the intensive work of Curator Chris Sheppard and NYZS colleagues in ornithology, Wildlife Conservation International, and nutrition. WCI's Stuart Strahl had studied the social ecology of hoatzins, and one of his students, Alejandro Grajal, determined their digestive physiology. Grajal consulted with Dr. Sheppard and New York Zoological Society Nutritionist Dr. Ellen Dierenfeld, both in New York and in Venezuela, to develop protocols for maintaining the species in captivity. With the assistance of students from both countries, a group of birds was captured and adapted to a diet including wild plants, romaine, and a powdered poultry meal. Following a period of quarantine at the Zoo, the two males and

### Bringing Time To Life

The zoogoer's observation of time is finite. What the animals were doing before the observer came, the evidence of those actions or their relevance, is rarely appreciated or thought about. The drama of contact with other creatures may not be seen, the sweep of natural history not perceived. Indeed, one of the most troublesome gaps in modern education involves the meaning of time, action, and consequence.

With the opening of

*JungleWorld* at the Bronx Zoo in 1985, time clues were placed within the living habitats and interpreted: a leopard's tracks, a fallen antler, an abandoned junglefowl nest, and a variety of botanical and geological clues. In the Zoo's Himalayan Highlands, opened in 1986, the remains of a snow leopard kill are found in the tragopan area. Now, in the new Baboon Reserve, time is part of the landscape—the 4th dimension has taken on a life of its own.

From one vantage point, a



Hoatzin in Venezuela.

field observation station on the edge of the highland plateau, the evidence of time includes a leopard's skull and scats of the hyena and vulture that fed on its carcass. An ostrich nest and giant termite mounds are seen along the southern edge of the West African village, looking toward the broad grasslands. Here also is the actual skeleton of a 35-year-old bull elephant killed by poachers in 1989 and made available to the Society by the Kenya Wildlife Service as a harsh lesson in conservation.

The most evocative segment of the timescape is a composite "Fossil Dig," which carefully recreates and exposes layers of paleontological history. The skeletal remains of prehistoric geladas are presented alongside those of the pre- and early humans that sometimes hunted them. Parallel lives can be traced as they evolved, sharing the high-altitude plains of East Africa. It is a fitting context for the visitor's encounter with the animals that occupy this dramatic landscape.

four females are now on exhibit in the Tree Tops area of the Aquatic Bird House. One pair has already formed.

Chairman Donald Bruning recently assisted Malaysian wildlife officials in Sabah, East Malaysia in collecting Bornean pheasants. As a result the Society will acquire two unrelated pairs of Malayan peacock pheasants, a long-term management species for which Dr. Bruning maintains the studbook. The new blood lines will be a significant addition to this program. In addition, four mountain or Rothschild's peacock pheasants, a pair of Malayan crestless firebacks, a pair of crimson-headed partridges, and a badly needed male Malayan argus pheasant were acquired. Both the mountain peacock pheasant and the crimson-headed partridges are new to the collection and probably the first in any U.S. zoo.

Dr. Bruning continues to serve as chairman of the AAZPA-WCMC and of the ICBP-IUCN/SSC Parrot Specialist Group. He testified as an expert witness for the U.S. Justice Department in a series of bird-smuggling cases, served on a population viability analysis team for the Puerto Rican Parrot in Puerto Rico, the Bali myna in Indonesia, and participated in discussions with Indonesian authorities on efforts to stem the continued export of large numbers of Indonesian parrots, especially cockatoos.

Dr. Sheppard serves as international studbookkeeper for the white-naped crane and Species Survival Plan chairman for Gruidae, the crane family. As a member

Ancient gelada and human skulls at the Fossil Dig.





One of Madagascar's colorful panther chameleons.

#### Mission To Madagascar

In January and February of 1990, Herpetology Curator John Behler and Wildlife Survival Center Curator John Laderosa joined two curators from zoos in Texas for an investigative trip to the Malagasy Republic. "Very few reptile curators have been there," says Behler. "Madagascar is in very serious trouble, environmentally. This was an opportunity to expand our horizons and to see some of the world's most unique fauna." The trip was made in conjunction with the Madagascar Fauna Group, a consortium of zoos working with the Malagasy government to improve local zoos and develop breeding programs. The team visited almost every ecosystem type in the country.

They saw many animals endemic to Madagascar, including unusual lemurs like aye-ayes and indris, three out of the four native tortoise species, all three species of boas, and many chameleons.

frogs, and gekkos. Particularly rewarding was the sight of radiated tortoises. The latter has been the subject of a long-standing NYZS breeding program conducted at the Wildlife Survival Center on St. Catherines Island, Georgia. Thirty-eight were born this past year. The WSC also has the only breeding population of plowshare tortoises outside of Madagascar.

The plowshare tortoise is the most endangered species of tortoise in the world. Only an estimated 100 are left in the wild on Madagascar. One of the most important stops on the team's itinerary was Ampijoroa, a forestry station and site of a breeding program for this species. While there, Behler and Laderosa finalized plans for a male to join the single male and two females on St. Catherines. A visit to a rehabilitation center for radiated tortoises confiscated by the government also opened discussions on sending radiates to the Wildlife Survival Center.

"The trip was an excellent chance to interact with the conservation organizations working in Madagascar," says

Behler. Two local zoos, Tsimbazaza and Ivoloina, were visited, and plans were discussed for developing cooperative programs with zoos in the U.S. The team targeted certain species, in addition to the tortoises, for special attention, including several chameleons and gekkos, and tomato and mantella frogs. "The future is bleak," according to Behler, "because the habitat is disappearing very

quickly. Some animals may become zoo wards, but we can develop recovery plans for others and call upon the international conservation community to help save their habitat."

The Society's involvement in Species Survival Plans for the radiated tortoise and for the ground boa, and its work with the plowshare tortoise, are all part of the recovery plans.

John Behler with radiated tortoises at Ampijoroa Forestry Station.



of the Captive Breeding Specialist Group, she is developing an action plan for Psittaciformes, the order of parrots and parakeets. She is also active on the AAZPA conference program committee.

The Ornithology Department is now responsible for studbooks for the Malayan peacock pheasant, white-naped crane, pink pigeon, great hornbill, and Waldrapp ibis.

Planning for a major renovation of the Lila Acheson Wallace World of Birds is well under way. The project will unfold in phases, commencing with the Australian, New England, and Asian exhibits. Preliminary design work has also begun on Propagation II, which will accommodate our existing collection during the World of Birds renovation, then house our expanding propagation programs for rare and endangered birds.

Construction was scheduled to begin in the fall.

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Malayan river terrapin hatching on April 22, 1990.

#### Bronx Zoo Reptiles and Amphibians

The Malayan river terrapin, a rapidly vanishing Asian species, joined the growing list of endangered turtles and freshwater turtles that have bred at the Bronx Zoo. It is believed to be the first captive breeding outside of the species' native Southeast Asian habitat. Six hatchlings emerged from their three-inch-long eggs after 80 days of artificial incubation in the Reptile House. The 70-pound female parent, who lives in the gharial exhibit at JungleWorld, is a 30-year captive on loan from the Columbus Zoo in Ohio. The male parent is one of seven suitors received in 1985 as four-year-old juveniles, a gift of the Department of Wildlife and National Parks in Peninsular Malaysia.

Endangered turtle breeding during the year was also successful in Madagascan radiated tortoises, Travancore tortoises, New Guinea snappers, and Coahuilan box turtles. Other notable hatchings and births included nearly 300 New Guinea giant treefrogs, Asian tentacled snakes, Brazilian rainbow boas, blood



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pythons, Madagascan ground boas, African sand boas, and red-tailed ratsnakes.

Acquired for JungleWorld were a trio of Fly River turtles from the Zurich Zoo and several adult painted batagurs from Malaysia. They join others of their kind in the gharial exhibit and increase our chances for the successful reproduction of these vanishing species. Six hatchling Parker's snakeneck turtles from New Guinea were received from the Stuttgart Zoo and are displayed in the Reptile House Nursery. They are the only examples in North American zoo collections.

Early news from the department's cooperative National Park Service program is very encouraging. As part of the herpetofaunal restoration project in Gateway National Park, marked hognose snakes hatched at the Bronx Zoo were first liberated at Breezy Point on Rockaway Inlet two years ago. Recent recoveries of these animals, which are a New York State "Special Concern" species, have shown that they have fared well on their native toad diet, matured rapidly, and are now contributing to the next generation of wild snakes.

The department continues to work closely with the New York Department of Environmental Conservation on local reptile and amphibian problems. DNA work has been initiated on the endangered Muhlenberg's turtle to determine if good population markers can be found to help thwart illegal commercial trade in this species.

Curator John Behler and Superintendent William Holmstrom remain species coordinators and studbook keepers for the Chinese alligator and Madagascan radiated tortoise, respectively. Behler coordinates the AZA Crocodilian Advisory Group, serves as deputy chairman of the IUCN Freshwater Turtle and Tortoise Specialist Group, and has been invited to join the IUCN Captive Breeding Specialist Group. In January and February 1990 he joined several other zoologists on a country-wide survey of wildlife on Madagascar (see story on page 16). Behler also administers the Nixon Griffis Fund for Zoological Research. Since its inception in 1985, 71 grants totaling more than \$190,000 have been awarded.

### Wildlife Survival Center

The release of a radio-collared, free-ranging troop of lion-tailed macaques at the south end of St. Catherines Island promises to be a landmark captive primate project. A nearly complete shelter for the macaques will serve as a feeding and watering site as well as protection against inclement weather. Long-range plans call for the reintroduction of young from this group into the rain forests of the Western Ghats in India, where only 4,000 macaques survive, threatened by habitat destruction and hunting.

Other free-ranging primate groups on the island continue to breed successfully: two more female ring-tailed lemurs were born, and the ruffed lemurs produced their first viable offspring, a male. In the sandhill crane release project, three confirmed nests were observed and a fourth was presumed. Two clutches of eggs were destroyed by predators, but two were hatched, and one chick has been raised to near fledging.

Distribution of the WSC's addra gazelle herd to other institutions in 1989 opened up valuable captive habitat for the bontebok, another endangered hooved animal. The bontebok was saved from extinction in southern Africa at the turn of the century by ranchers who captured some animals and moved them to farms where their numbers increased significantly. Today, as a result of the farmers' foresight, the bontebok survives, but only on these ranches, in several zoos, and in Bontebok National Park, South Africa.

Other new species acquired this year include helmeted curassows, an extremely endangered cracid from Venezuela and the focus of fieldwork by Stuart Strahl of the Society's Wildlife Conservation International. The pair of birds are offspring from pairs at the Bronx and Houston Zoos. Other new avian species include: black-crowned cranes from West Africa and paradise cranes from southern Africa. Both are in decline because agriculture is destroying their nesting habitat.

Several desperately needed facilities were added during the year, including a commissary-brooder area for rearing chicks, preparing food, and observing the

bird collection, and an office-lab complex which will have a small surgery and holding area for sick and injured small mammals and birds.

Seventy percent of the species at the WSC produced young last year. Among them were: radiated tortoises; yellow-knobbed and bare-faced curassows; Leadbeater's cockatoos; caninde and red-fronted macaws; Pesquet's parrots; parma wallabies; ring-tailed, white-fronted, ruffed, and black lemurs; lion-tailed macaques; Grevy's zebras; Arabian oryx; sable antelope; Nile lechwe; Jackson's hartebeest; and slender-horned gazelles. After taking a year off, even the maleos, severely endangered ground-nesting birds from Indonesia, produced eggs, one of which is fertile and being artificially incubated. Maleos hatched in 1988 were the first ever bred in captivity.

In January and February of 1990, WSC Curator John Iaderosa and Herpetology Curator John Behler joined two curators from Texas zoos to investigate the status of reptiles and other fauna in the Malagasy Republic. The trip succeeded in forging a link between the WSC, the Malagasy government, and local conservationists (see story on page 16).

#### New York Aquarium

During its first year, Discovery Cove won praise from visitors, visiting curators, and educators, and earned widespread media attention. Soon after the opening, a 37-foot lobster boat was lowered into the moat, populated by local turtles and fishes, at a dock in front of the building. Complete with wheelhouse and working winches, and outfitted with lobster pots and other equipment, the boat was actually used in Atlantic waters before being donated to the Aquarium. Now, with the help of recordings that play the voices of real lobstermen against background sounds of the sea, it provides Aquarium visitors with a taste of what it is like to be a New England fisherman.

Inside Discovery Cove, the sandy shore and rocky coast exhibits were joined by the world's only indoor salt marsh, where natural sunlight falls on marsh grasses and marsh animals, including horseshoe crabs, hermit crabs, and snail-like periwinkles.



Adult Cassiopeia.

algae that grow in their tissues. The algae then produce energy and nutrients which are used by the jellyfish. In turn, the jellyfish provide protection and other nutrients to the algae.

#### Bottoms Up

*Two new exhibits at the New York Aquarium feature upside-down jellyfish of the genus Cassiopeia. In the Main Gallery are adult jellyfish in their own tank. In Discovery Cove juvenile jellyfish swim together with other young marine life in the Baby Faces tank.*

*Upside-down jellyfish occur in shallow tropical embayments around the world. They lie upside down with oral arms spread out to gather in plankton and increase the surface area exposed to light. This promotes photosynthesis in the*

*Most jellyfish have two main life stages: the free-swimming or medusa stage that most people are familiar with, and the polyp or scyphistoma stage, during which the jellyfish reproduce. A juvenile jellyfish or ephyra will settle on the bottom for a bit, but soon starts behaving like an adult, floating upside down with its underside exposed to the light.*

Juvenile Cassiopeias.



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In April 1990, NYZS President Howard Phipps, Jr. and Brooklyn Borough President Howard Golden joined Aquarium Director Louis Garibaldi and black-footed penguin Klousseau in ground-breaking ceremonies for Sea Cliffs. On completion in 1992, Sea Cliffs will surround the visitor with a 300-foot-long rocky coast habitat for walruses, seals, sea otters, and penguins. Aquarium visitors will be able to see the animals from below and above the water, and enjoy indoor, all-weather viewing of underwater panoramas and smaller exhibits.

The largest habitat will feature walruses, providing a new, more naturalistic home for the ever-popular Nuka, currently the Aquarium's only Pacific walrus. The sea otter exhibit will be the first for this species in the eastern United States. Exhibit space for the Aquarium's highly successful breeding colony of black-footed penguins will be enlarged to accommodate 60

Aquarium Director Lou Garibaldi (2d from left) shows Sea Cliffs model to Brooklyn Borough President Howard Golden (3d from left) and other supporters from the borough.



of these vocal and gregarious birds.

The \$19.6-million Sea Cliffs facility is being financed by the City of New York and the Zoological Society, which has received a \$1-million donation for Sea Cliffs from the William Randolph Hearst Foundation, a long-time Aquarium supporter.

Two unusual strandings occurred during the summer. A beaked whale, usually found hundreds of miles offshore and rarely seen in the wild, was rescued in Hampton Bays, Long Island and transported to the Aquarium by the Okeanos Ocean Research Foundation in July. Despite round-the-clock efforts to save it, the whale died three days later. A necropsy revealed that the stomach was filled with plastic debris, including plastic bags from as far away as Bermuda.

A spotted dolphin, common to southern Atlantic waters but rarely seen in aquariums, was found stranded in September. Although rehabilitation efforts were again unsuccessful, much was learned about this species, which behaviorists and veterinarians have not had many opportunities to observe up close.

Successful fish-breeding programs continued in abundance. There were numerous births of desert gobies, blind cavefish, and several species of clownfish. These fishes were successfully reared and sent to other institutions in Europe, Japan, and the United States. In addition, efforts are being directed towards improving the rearing process for banded coral shrimp, cuttlefish, and other species.

Dr. Paul Loiselle, assistant curator of freshwater fishes, is developing a Species Survival Plan for Lake Victoria cichlids. Numerous cichlids were spawned and reared and have added to the abundant collection of fishes in the African Rift Lake exhibit.

Among the marine mammals, another pup was born to the Aquarium's prolific harbor seal colony. The new male, born on June 15, joined two other recent additions—Bernie (1988) and Elga (1989)—and nine other gray and harbor seals who make the Aquarium their home.

Attendance at the Aquarium reached 751,133 in fiscal year 1990, a six percent increase from fiscal year 1989.



Dr. Cook and Aquarium staff try to save a rare stranded beaked whale.

#### Osborn Laboratories of Marine Sciences

Fish Geneticist Dr. Klaus Kallman has discovered a genetic system that determines the size and age at which platyfish and swordtails, of the genus *Xiphophorus*, become sexually mature. Among many animals, such as land mammals, these attributes show very little variation. Among fishes, however, there is marked variation which, until now, was thought to result from environmental factors. Ongoing studies reveal that genetic variability is actually the cause.

In the southern platyfish, genes that control maturity

function similarly in both males and females. In other *Xiphophorus* species females mature early but males can be early or late, depending on which gene they have inherited from their fathers. Behavioral studies being done along with the genetics research show that small, early-maturing males unable to compete with larger males, sneak up from behind to fertilize the female. Large, late-maturing males approach the female from the front and exhibit elaborate courtship behavior.

Variation in the age and size at which fish mature has important economic implications. For example, Atlantic salmon that mature early are too small to have commercial value in comparison to larger fish that have fed in the ocean for several years before returning to streams to spawn.

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Xiphophorus is also the subject of ongoing field-work in eastern Mexico. Ten years ago no Xiphophorus was known from this region. Now, many populations, perhaps including undescribed species, have been discovered in the deep gorges of the Sierra Madre.

Pathology researchers isolated eight different species of Vibrios from fish and cephalopods at the Aquarium; 32 cases of vibriosis were recorded. One variety of Vibrio found in Atlantic salmon during acclimatization from fresh to salt water is a human pathogen that causes gastroenteritis. *Vibrio vulnificus*, which usually contaminates oysters, was found in a butterflyfish. Pathologist Dr. Paul Cheung discovered that the outbreak of disease from *Vibrio harveyi*, a ubiquitous marine bacterium, is related to environmental stress. Vibriosis in fish and cephalopods was successfully

Aquarium Keeper Robert Fournier moves loggerhead turtle in the Bermuda Triangle exhibit.



treated with antibiotics in feed or by injection.

Trace metals are both nutrients and toxicants, and are the subject of student research at OLMS. Copper, for instance, either stimulates or inhibits depending on its concentration. Miss Yin-Shen Lai, one of several students from Stuyvesant High School in Manhattan, studied the effects of copper on grass shrimp, *Palaemonetes vulgaris*, an important species in the food chain of the Hudson-Raritan Estuary. She demonstrated that copper at low dosage (0.1 ppm) has some growth-promoting effects on the shrimps and that the up-take of copper by the body tissues is proportional to the body weight. With this project, Yin-Shen was a semi-finalist in the Westinghouse Science and Talent Search and in the St. John's University Science Fair.

### Central Park Zoo

In August 1989, the "new" Central Park Zoo celebrated its first birthday. From then on, birthdays were the theme as 704 animals produced 145 babies during the Zoo's second year. Tropical birds were the most prolific, with 77 chicks raised by eight different species, including azure-winged magpies, turquoise tanagers, red-faced parrot finches, and Peking robins. The prize for breeding success goes to one pair of shama thrushes which fledged 24 chicks in a single season. Also among the birds, by June 1990 both the gentoo penguins and their exhibit-mates, the puffins, had produced their first eggs.

Among the mammals, the Japanese macaques produced young for the second year in a row and two black-and-white colobus monkeys gave birth for the first time. The colobus babies are a delight to Zoo visitors, as is the new California sea lion pup.

Amphibians and reptiles were also the focus of breeding efforts. Following research into their habits and nutrition, six green-and-black poison dart frogs, a threatened species, were successfully bred for the first time. Other offspring included ornate horned frogs, giant marine toads, Cuban giant anolis lizards, and a second generation of tentacled snakes.

The Exhibition and Graphic Arts Department improved the leafcutter ant exhibit in the Tropic Zone. Visitors can now see the tiny video cameras inside the tunnels. Nest boxes were incorporated into the puffin



Snow monkeys and a whooper swan dispute territory at the Central Park Zoo.

exhibit, and a pair of life-size polar bear feet (made from rubber and fake fur) was designed for use by the Education Department.

In the Zoo Gallery, the first major art exhibit featured works by the Society of Animal Artists, and included paintings as well as bronze, wood, and ceramic sculpture. The show's official opening on May 23, 1990, coincided with a dinner dance sponsored by the New York Zoological Society's Women's Committee.

#### Flushing Meadows and Prospect Park Zoos

At the Queens Zoo, construction continued on the animal exhibits, work began on the informational

graphics, and Curator of Animals Robin Dalton began making arrangements to obtain animals. One exhibit will feature the endangered red wolf, which is part of the AZA's Species Survival Program. A number of zoos are cooperating with the U.S. Fish and Wildlife Service to reintroduce red wolves in the southeastern United States, and the Flushing Meadows Zoo will play an important role in this program. Other animals to be exhibited, emphasizing North American wildlife, include Roosevelt elk, black bear, puma, bobcat, American bison, prairie dogs, wild turkey, sandhill cranes, and a variety of waterfowl.

On August 29, 1989, Dr. William Conway, Richard Lattis, former Mayor Ed Koch, and former Parks Commissioner Henry Stern were present at groundbreaking ceremonies in Brooklyn for the reconstruction of the Prospect Park Zoo. When it reopens it will be a children's zoo.

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### Exhibition and Graphic Arts

By the end of June 1990, the final touches were being applied to the Bronx Zoo's Baboon Reserve and African Market, on which work had begun a little more than two years earlier. In the spectacular re-creation of Ethiopia's high grasslands, two lively troops of gelada baboons, a herd of Nubian ibex, Abyssinian blue-winged geese, and other waterfowl were becoming acclimated before the exhibit's public opening in July. The animals are seen from various vantage points around the perimeter, including a rustic observation station with telescopes for close-up viewing, an earth-covered blind, and a field lab classroom named for the late New York Zoological Society Trustee Charles W. Nichols, Jr.

Bordering the Reserve is a simulated West African village—the African Market—in the monumental mud-and-thatch Somba style of architecture, partially funded by the ITT Corporation. Housed here are refreshment and merchandise facilities, as well as the Africa Lab classroom and places for visitors to rest or to observe not only the new Baboon Reserve to the north but also the rolling African grasslands exhibits to the south.

Work on the five-acre complex involved an extraordinary variety of unusual tasks by in-house designers, sculptors, painters, and artisans, as well as outside contractors. Extensive rockwork was fabricated throughout the habitat and adjacent viewing areas. The

tall, circular buildings of simulated mud were painted with West African geometric designs and crowned with thatching. Animal tracks, footprints, and mudcracks were imprinted on the concrete walkways to suggest the traffic of an inhabited village. A stratified "fossil dig" was outfitted with human and gelada skulls and skeletons to illustrate time as a dimension of life and evolution (see story on page 14). Huge termite mounds, a secretary bird's nest, and the skeleton of a poached elephant from Kenya were installed along the periphery of the African Plains. And the horticulture staff planted thousands of ornamental grasses and African wildflowers, grey and thorny shrubs, and other plant species to evoke the feeling of a high-altitude Ethiopian savanna.

Even after its public opening in July 1989, the Keith W. Johnson Zoo Center continued to evolve. In October, a pair of monumental three-ton bronze rhino sculptures were installed on pedestals in the formal Rhino Garden on the south side of the building. Commissioned originally by Harvard University, they are the work of the noted Boston "animalier" Katherine Weems, who modeled them after the Indian rhino Bessie, a resident of the Bronx Zoo from 1923 to 1962. In the spring, the rhino habitat on the building's west side was prepared for the arrival of Rapunzel, one of only a few hundred remaining Sumatran rhinos.

Renovations at the World of Darkness included a bamboo forest habitat for night monkeys and porcupines, a dry scrubland dramatically lighted by moonlight for mouse lemurs, and an experimental participatory exhibit that allows people to see scorpions glowing in ultraviolet light. An entirely new system of graphics was installed employing back-lighted photographs and videos that focus on nocturnal adaptations and senses.

Funding from the City of New York enabled reconstruction on the sediment-filled Holartic Tarn. Due for 1991 completion, the new interconnected series of northern ponds will exhibit endangered swans, cranes, and wildfowl. Beaver dam construction techniques are being used to evoke this habitat's distinctive ecology, which will be stressed in the exhibit's interpretive graphics.

Elephant remains being installed by landscape architect Michael Dulin.





Paxton and Ashleigh Pattee prepare to leave their footprints at African Market, encouraged by Walter Deichmann and John Gwynne of EGAD.

Many months of study and planning by staff and the architectural firm of Davis, Brody & Associates resulted in a design breakthrough, providing the means for transforming Astor Court's Lionhouse into an Amazonian exhibit. Its centerpiece will be an expansive Brazilian flooded forest habitat for marmoset families in the trees and great fishes in the waters below. Adjacent galleries will be intensive and innovative high-tech learning centers where visitors can interact with exhibits and compare themselves to the planet's fast-disappearing wildlife. Initial program development also began for the Great Gorilla Forest and Conservation Center.

The department's new Macintosh computers, scanner, and printer have helped increase the quality of

graphics design and triple the volume of production during busy periods. Widely used in the development of new exhibition graphics and animal identification labels, they were also valuable in creating signage for price changes, ride attractions, donor plaques, study books, pamphlets, and dozens of public information messages installed throughout the park.

Planting proceeded at the new browse propagation center and plant nursery at the south end of the Zoo, where polyhouses, or temporary shelters, were erected to protect plants during the winter. A permanent energy-efficient greenhouse is being designed for the site with funds from the Norcross Foundation and is scheduled for construction next year. City funds were allocated for reforestation of parts of the park that have suffered from Ash Decline disease. Important horticulture maintenance was undertaken at JungleWorld, and seasonal interns have been monitoring plant-animal interactions throughout the Zoo.



**Chief Veterinarian Robert Cook and Senior Technician Judith Kramer treat an orphaned Thomson's gazelle.**

#### **TLC At The AHC**

Behind closed doors, in a cozy plywood enclosure, on a soft bed of hay, and under a soothing heat lamp, is a shaggy one-day old Thomson's gazelle. Yesterday it was an orphan. Today it has a very good chance of survival, thanks to the technicians and veterinarians at the Animal Health Center.

Occasionally, in the wild or in captivity, an animal will abandon a newborn. At the Bronx Zoo, when this happens, a keeper will rescue the baby and take it immediately to the Center. There it is fed sugar water intravenously, and settled into a warm spot.

During its first day, an orphaned animal will be soothed and kept company for many hours, usually by a technician like Supervisor Judy Kramer. In her 13 years at the Zoo, Kramer has tended to many newborn deer and gazelles, several primates, a

*hippo, a Mongolian wild horse, and a sea lion. Her compassionate and competent care, under the guidance of the late Dr. Emil P. Dolensek, and now under current Chief Veterinarian Dr. Robert A. Cook, is the primary reason for so many successes.*

*The biggest challenge is getting the baby to feed from a bottle. It takes coaxing and cooing, and patience. Most animals need a night-feeding at about 11:00 pm. For such reasons, veterinarians Dr. Paul Calle and Dr. Tracey McNamara live on Zoo grounds, to be available for care and emergencies.*

*An orphaned Thomson's gazelle may be hand-raised for 10 to 12 weeks, or until it only needs one or two bottles a day. It is then reintroduced to its herd, safe in the care of its keepers. Sometimes, when more than one baby has been abandoned, they are returned to the herd together. This helps them form an instant peer group, which gives them an extra edge up on their continued survival.*

#### **Animal Health**

The past year was a time of great sadness and change for the department. Dr. Emil P. Dolensek, chief veterinarian since 1969, died after an extended struggle with cancer. Dr. Robert A. Cook, a protégé of Dr. Dolensek's and a member of the staff for five years, was appointed new chief veterinarian. Other additions to the staff included Drs. Paul Calle and Bonnie Raphael as clinical veterinarians and Dr. William B. Karesh as head of the newly created international Field Veterinary Program. Dr. Calle has devoted part of his time to the care of the Central Park Zoo collection, working with Animal Health Technician Robin Moretti. Judy Kramer was promoted to animal health technician supervisor, Virginia Walsh to office manager, and the technical staff now includes Pam Manning and Ivan Llanes, animal health technicians, Alfred Ngbokoli, histotechnologist, and Marianne Pennino, Nutrition Technician. Stephen Porter, computer technician, is upgrading pathology, nutrition, and clinical computer programs. Dr. Dave Kenny, clinical resident, finished his two years of study and moved on to a position at the Denver Zoo.

The Olympus flexible endoscope continued to aid the clinical staff in saving animal lives, particularly those of penguins. At the Bronx Zoo, zinc poisoning was prevented when a partially digested penny and two dimes were removed from the stomach of a Magellanic penguin. Gentoo penguins at the Central Park Zoo were relieved of sharp feather shafts in their stomachs. The endoscope was also used to retrieve radio transmitters from water monitors in a biotelemetry project undertaken by Mammal Curator Dr. Fred Koontz.

Teamwork saved baby gorillas Lusi and Koga from a life-threatening diarrhea caused by severe intestinal colitis. Human physician Dr. Jim Grillo, pediatrician Dr. Stephen Schwartz, and specialists from Roosevelt Hospital assisted Animal Health Center and Mammal Department staff in providing 24-hour-a-day care for nearly three weeks. The superhuman effort, which involved various medications, tests, and intravenous feeding, paid off as the gorilla babies again became

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**Dr. Emil Dolensek, the Society's chief veterinarian from 1969 to 1990.**

interested in eating, and their intestines started digesting food properly.

At the New York Aquarium, Drs. Cook and Kenny were assisted by Aquarium technicians Catherine McClave and Sheila Palma, and the Aquarium training and animal department staff, in treating Kathy and Newfy, beluga whales suffering from kidney problems. Ginger the harbor seal was treated for a generalized infection following the loss of her pup in-utero. An extremely rare Antillean beaked whale found stranded off Long Island received around-the-clock care in efforts to save her, but she died within three days. Pathologist Dr. Tracey McNamara discovered an assortment of plastic bags and human garbage in the stomach which prevented food from passing through. Because the available endoscope was not long enough to reach the whale's stomach, a new ten-foot-long version was created by the Olympus Company to deal with such emergencies in the future.

In its ongoing search for reliable vaccines and medications, the Animal Health Department tested several new drugs intended to fight bacterial, viral, and parasitic infections. Initial findings show that a new vaccine against aspergillosis, a deadly fungus in birds, may be effective.

Pathologist Dr. Tracey McNamara participated in a course on exotic animal diseases at the Foreign Animal Disease Diagnostic Laboratory at Plum Island, New York. This specialized training will be particularly helpful in diagnosing rare and unusual diseases that occur in the wild. A newly acquired video laser disc system, with over 21,000 kodachrome slides from 60 institutions worldwide, will also aid in the diagnosis of disease, and will be a valuable teaching resource as well.

Diet review and refinement continues at all NYZS facilities under the direction of Nutritionist Dr. Ellen Dierenfeld. A significant breakthrough was the development of a highly specialized diet for recently arrived hoatzins, tropical South American birds that are almost exclusively leaf-eaters. Techniques for measuring vitamin E levels in fresh green plants were refined in a collaborative study with scientists in Kenya and Zimbabwe, in which more than 50 species of plants eaten by black rhinos were identified and analyzed. On a national level, Dr. Dierenfeld advised the Captive Breeding Specialists Group on the nutritional management of Puerto Rican parrots, and she continues with the American Association of Zoological Parks and Aquariums projects involving cheetahs, Asian elephants, black and Indian rhinoceros, giant pandas, orangutans, and infant diet care.

The new international Field Veterinary Program was created with major support from The Bay Foundation and further assistance from the Pfizer Corporation. The program provides clinical, nutrition, and pathology services to the field projects of Wildlife Conservation International and other organizations. Dr. William B. Karesh was hired in October to further develop, coordinate, and implement this unique program (see story on page 28).



Dr. William Karesh taking blood from a jackal in Tanzania.

#### Darting Around The World

The New York Zoological Society has taken yet another pioneering step in animal health care by launching the new Field Veterinary Program. Under the direction of Dr. William B. Karesh, and supervised by Chief Veterinarian Dr. Robert A. Cook, it is the first program of its kind for any zoo or conservation organization. Its objective is to facilitate the work of WCI and other field scientists seeking better information on animal behavior, nutrition, genetics, breeding, and general health. This is done partly through the analysis of skin, blood, and fecal samples.

To help him in his work, Dr. Karesh has invented a unique biopsy dart, which can be used to collect skin samples. On contact, the dart pinches a small piece of an animal's skin and falls to the ground. There is no need to immobilize the animal or even touch it. Enough skin is obtained without harming the animal to provide a biopsy suitable for analysis, and the whole proce-

dure is accomplished without anesthesia.

Dr. Karesh first traveled to East Africa. In Tanzania, he assisted WCI Senior Staff Zoologist Dr. Patricia Moehlman in the development of humane techniques for immobilizing jackals to obtain blood samples for disease assessment. Blood sampling is a much more complicated task than skin sampling. In the course of 15 days, correct dosages were established, samples were obtained, and no animal experienced lasting effects. All data will be entered into a computer database for use by zoo and wildlife veterinarians all over the world.

In Kenya, Dr. Karesh worked with Dr. Nicolas Georgiadis, who is conducting a genetic study of elephants. The dart was used to collect skin samples from 36 elephants in Amboseli National Park. This study will develop a set of genetic markers that can be used to trace the specific origin of confiscated ivory. Such information could prove to be instrumental in helping to stem the ivory trade.

Dr. Karesh's second trip took him to Indonesian Borneo and Sumatra as part

of a joint study with the Woodland Park Zoo on orangutan genetics.

"Orangutans are found by checking at trees known to be fruiting, looking or listening for signs of feeding, checking areas around fresh nests, listening or looking for large branch movements, listening for the calls of males, smelling them and, rarely, by spotting them in the trees," says Karesh.

The data obtained through the use of the dart will be used to compare the endangered populations on the two islands.

A complete genetic portrait of isolated populations is essential in the planning and management of protected areas in the wild, breeding programs in captivity, and potential translocations or reintroductions in the future.

The biopsy dart kit used by Dr. Karesh in the field.



## SANCTUARIES FOR WILDLIFE

### Animal Management Services

An important step in developing a formal research program was achieved this year with the publication of the New York Zoological Society Zoo and Aquarium Research Manual, prepared by Research Coordinator Michael Hutchins and the Society's Zoological Research Committee. The manual will serve as a guide for all who conduct research at NYZS facilities, including both visiting and staff scientists. It will also facilitate the coordination of efforts within the Society and with other institutions.

George Amato's genetic research continued to provide valuable information for the Society's breeding and conservation programs. DNA data was used recently to confirm that an unusual-looking hatchling was not an American alligator hybrid, but was, instead, a Chinese alligator. This determination could not have been made without genetic detective work. Gene sequencing by PCR (polymerase chain reaction) resolved the hybrid question and also provided new and useful information on the biological relationships among crocodilians in general. Amato and his collaborators at Yale University and the American Museum of Natural History showed that the gharial and false gharial are closely related. This question has been debated for a long time by morphologists and biologists using biochemical techniques.

Conservation management is often dependent on precise species definition. For the rare Chinese sika deer, our mitochondrial DNA analysis appears to support distinct subspecies status for several geographically separated populations, a finding difficult to determine with traditional data. Additional work in progress is intended to establish whether or not such genetic differences warrant maintaining these subspecies separately. This will be important to the future management of the Bronx Zoo's rare Formosan sika deer herd.

In the second year of the animal identification program conducted by Susan Elbin and supported by

the Institute of Museum Services, the "implantable microchip," or transponder, was successfully used in more than 150 birds and mammals. Transponders can provide positive identification of the animals over their entire lifetimes, allowing for better and more complete life-history records. Elbin also has initiated the pilot study of bar code technology for rapid and accurate transcribing of husbandry data from the animal facilities to the Animal Record Keeping System (ARKS). She is now co-chairperson of the IUCN Captive Breeding Specialist Group Committee on permanent animal identification.

As species coordinator for the Snow Leopard Species Survival Plan, Curator Dan Wharton traveled to the VIth International Snow Leopard Symposium in Kazakhstan, USSR to deliver two presentations and participate in the drafting of a set of resolutions on snow leopard protection. Several resolutions on the formation of international snow leopard reserves along Soviet borders were based on the data and recommendations of WCI's Director for Science George Schaller. Wharton continued to work with additional SSPs, including those of the western lowland gorilla, barasingha deer, and the lion-tailed macaque. He will be taking over the chairmanship of the Marsupial and Monotreme Committee established by Michael Hutchins, who recently became the AAZPA's director of conservation and science.

Animal Records arranged 205 animal transactions to and from other zoos and applied for 33 Federal permits for exchanges with foreign zoos. Fu Jie, otherwise known as Annie Fu, from the Beijing Zoo was trained under Nilda Ferrer, Animal Records Specialist, in the use of the ISIS/ARKS as well as in the new computerized studbook keeping program, SPARKS.

Librarian-Archivist Steven Johnson has begun assembling a database of more than 3,500 technical and popular articles by NYZS staff. Literature searches were conducted for staff from all divisions of the Society, and new technologies in library science have linked the NYZS library to essentially everything in print.

# SANCTUARIES FOR WILDLIFE

## Animal Censuses (at Dec. 31, 1989)

### BRONX ZOO

Mammals	Species and subspecies	Specimens in Zoo	Births/Hatchings
Marsupialia—Kangaroos, phalangers, etc.	3	48	0
Insectivora—Hedgehogs	1	5	3
Chiroptera—Bats	8	539	269
Primates—Apes, monkeys marmosets, etc.	28	205	76
Edentata—Armadillos, sloth, anteaters	2	4	0
Lagomorpha—Rabbits	1	3	0
Rodentia—Squirrels, mice, porcupines, etc.	44	315	220
Carnivora—Bears, raccoons, cats, dogs, etc.	24	103	12
Pinnipedia—Sea lions, etc.	1	12	2
Proboscidea—Elephants	2	6	0
Hyracoidae—Hyraxes	1	3	0
Perissodactyla—Horses, rhinoceroses, etc.	5	50	9
Artiodactyla—Cattle, sheep, antelope, etc	28	463	151
<b>Totals</b>	<b>148</b>	<b>1,756</b>	<b>733</b>
Amphibians and Reptiles	Species and subspecies	Specimens in Zoo	Births/Hatchings
Caudata—Salamanders	4	5	0
Anura—Frogs, toads	21	36 <sup>a</sup>	272
Chelonia—Turtles	46	322	35
Crocodylia—Alligators, caimans, crocodiles	12	9 <sup>a</sup>	0
Squamata (Sauria)—Lizards	21	83	1
Squamata (Serpentes)—Snakes	49	301	126
<b>Totals</b>	<b>153</b>	<b>1,175</b>	<b>434</b>

Birds	Species and subspecies	Specimens in Zoo	Births/Hatchings
Struthioniformes—Ostriches	1	3	0
Rheiformes—Rheas	1	5	0
Casuariiformes—Cassowaries, emu	2	5	0
Tinamiformes—Tinamous	2	5	0
Sphenisciformes—Penguins	2	7	0
Pelicaniformes—Pelicans, cormorants	3	21	0
Ciconiiformes—Heron, storks, flamingos, etc.	14	117	22
Anseriformes—Swans, ducks, geese, screamers	40	160	6
Falconiformes—Vultures, hawks, eagles	6	16	0
Galliformes—Quail, pheasant, etc.	24	90	28
Gruiiformes—Hemipodes, cranes, rails, etc.	19	61	7
Charadriiformes—plovers, gulls, etc.	23	109	5
Columbiformes—Pigeons, doves	10	34	9
Psittaciformes—Parrots, etc.	15	4 <sup>a</sup>	8
Cuculiformes—Touracos	5	11	0
Strigiformes—Owls	7	9	1
Caprimulgiformes—Frogmouths	1	6	0
Coliiformes—Mousebirds	1	2	0
Coraciiformes—Kingfishers, hornbills, etc.	16	35	10
Piciformes—Barbets, toucans, woodpeckers	4	7	0
Passeriformes—Perching birds	88	266	39
<b>Totals</b>	<b>284</b>	<b>1,015</b>	<b>135</b>

**Bronx Zoo Census**      **585**      **3,946**      **1,302**

**N.B.** The Bronx Zoo census includes 1,391 animals of 223 endangered, threatened, or vulnerable species. 402 animals was on loan to 90 other wildlife collections, and 236 animals was on loan from 60 other wildlife collections

## CHILDREN'S ZOO, BRONX ZOO

Mammals	Species and subspecies	Specimens at zoo	Births/Hatchings
Insectivora—Hedgehogs	3	10	0
Primates—Tamarin	1	1	0
Edentata—Armadillos	3	3	0
Lagomorpha—Rabbits	2	14	0
Rodentia—Mice, porcupines, etc.	6	28	0
Carnivora—Foxes, ferrets	6	20	0
Perissodactyla—Horses	2	3	0
Artiodactyla—Goats, sheep, camels, etc.	5	38	6
<b>Totals</b>	<b>28</b>	<b>117</b>	<b>6</b>

Birds	Species and subspecies	Specimens at zoo	Births/Hatchings
Ciconiiformes—Heros	4	24	4
Anseriformes—Ducks, geese	14	109	29
Falconiformes—Falcons	1	3	0
Galliformes—Chickens	3	43	5
Columbiformes—Doves	2	3	0
Psittaciformes—Parrots	10	11	0
Strigiformes—Owls	3	4	0
Caprimulgiformes—Frogmouths	1	1	0
Piciformes—Toucans	1	1	0
Passeriformes—Perching birds	1	1	0
<b>Totals</b>	<b>40</b>	<b>200</b>	<b>38</b>

Amphibians and Reptiles	Species and subspecies	Specimens at zoo	Births/Hatchings
Caudata—Salamanders	1	4	0
Anura—Frogs, toads	3	18	0
Chelonia—Turtles	8	55	0
Crocodylia—Alligators	1	9	0
Squamata (Sauria)—Lizards	5	10	0
Squamata (Serpentes)—Snakes	7	25	0
<b>Totals</b>	<b>21</b>	<b>99</b>	<b>0</b>

Children's Zoo Census	89	416	44
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N.B. The Children's Zoo census includes 83 animals of 37 endangered, threatened, or vulnerable species. 1 animal was on loan to another zoo, and 13 were on loan from 5 other wildlife collections.

# SANCTUARIES FOR WILDLIFE

## WILDLIFE SURVIVAL CENTER, ST. CATHERINES ISLAND, GEORGIA

Mammals	Species and subspecies	Specimens at Center	Births/Hatchings
Marsupialia—Wallabies	1	15	2
Primates—Lemurs, macaques	5	60	14
Perisodactyla—Zebras	1	12	2
Artiodactyla—Antelope	6	88	30
<b>Totals</b>	<b>13</b>	<b>175</b>	<b>48</b>

Birds	Species and subspecies	Specimens at Center	Births/Hatchings
Ciconiiformes—Storks	1	10	0
Galliformes—Pheasants	5	15	3
Gruiiformes—Cranes, bustards	10	40	2
Psittaciformes—Parrots	10	49	19
Coraciiformes—Hornbills	5	9	0
<b>Totals</b>	<b>33</b>	<b>123</b>	<b>24</b>

Reptiles	Species and subspecies	Specimens at Center	Births/Hatchings
Chelonia—Turtles	3	91	47

**N.B.** The WSC census includes 331 animals of 30 endangered species. 100 animals were on loan to 35 other wildlife collections, and 74 were on loan from 29 other wildlife collections.

## CENTRAL PARK ZOO (at June 30, 1990)

Mammals	Species and Subspecies	Specimens in Zoo	Births/Hatchings
Scandentia—Tree shrews	1	1	0
Chiroptera—Bats	2	115	0
Primates—Monkeys	4	45	11
Rodentia—Accouchis	1	2	0
Carnivora—Bears, otters, pandas	4	11	0
Pinnipedia—Seals, sea lions	2	8	1
<b>Totals</b>	<b>14</b>	<b>182</b>	<b>12</b>

Birds	Species and subspecies	Specimens in Zoo	Births/Hatchings
Sphenisciformes—Penguins	2	32	0
Anseriformes—Swans, ducks	3	6	0
Galliformes—Partridges	1	4	0
Charadriiformes—Puffins	1	22	0
Columbiformes—Doves	3	6	0
Psittaciformes—Parrots	2	10	0
Cuculiformes—Turacos	1	2	0
Piciformes—Toucans	1	2	0
Passeriformes—Perching birds	28	93	77
<b>Totals</b>	<b>42</b>	<b>177</b>	<b>77</b>

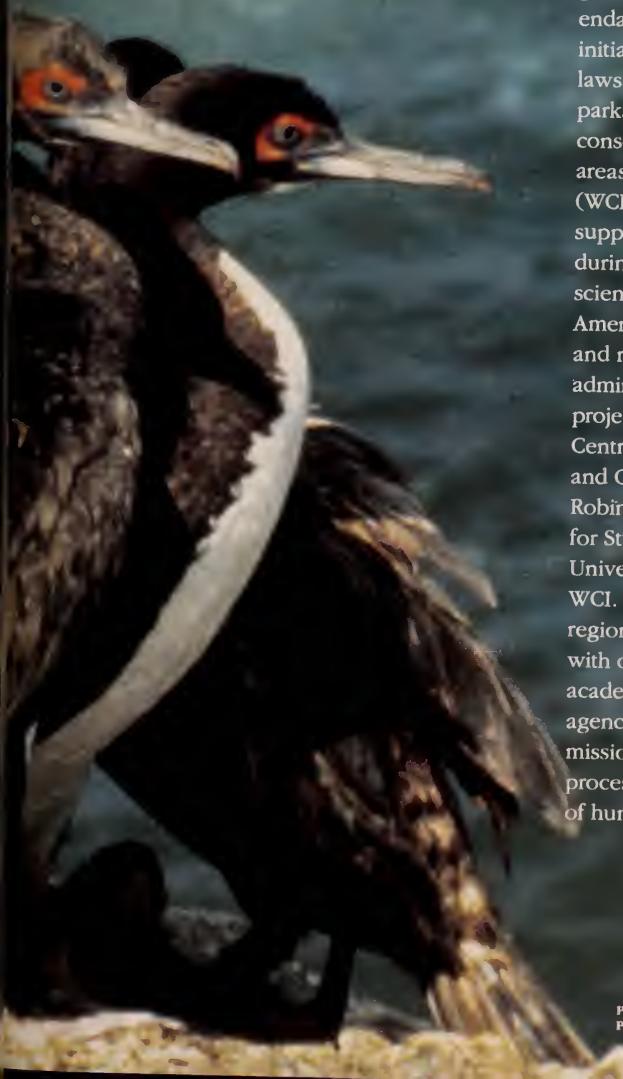
Amphibians and Reptiles	Species and subspecies	Specimens in Zoo	Births/Hatchings
Anura—Toads and frogs	19	153	30
Chelonia—Turtles	11	77	0
Crocodylia—Caiman, alligators	1	2	0
Squamata(Sauria)—Lizards	15	88	18
Squamata(Serpentes)—Snakes	7	25	8
<b>Totals</b>	<b>53</b>	<b>345</b>	<b>56</b>

**NEW YORK AQUARIUM**  
(at June 30, 1990)

Phylum	Class	Order	Species	Specimens	Phylum	Class	Order	Species	Specimens
Chordata	Chondrichthyes— Cartilaginous fishes: Sharks rays, chimeras	Heterodontiformes— Horn sharks Squaliformes— Typical sharks: dogfish, swell sharks	1	3			Gasterosteiformes— Seahorses, pipefish	3	18
		Rajiformes—Rays, skates	6	30			Scorpaeniformes— Sculpin, sea robins	5	26
			4	12			Perciformes— Perches, sea basses, porgies, eichlids, tangs, clownfish	189	1,480
Osteichthyes— Bony fishes	Lepidostremoniformes Lungfishes	1	2			Tetraodontiformes— Puffers, boxfish, triggerfish	5	24	
	Polypertiformes— Bichir	1	1		Amphibia	Anura—Toads and frogs	11	19	
	Semionotiformes— Garfish	1	6			Caudata— Salamanders	2	8	
	Amiiformes—Bowfin	1	5		Reptilia	Chelonia—Sea turtles	1	6	
	Elopiformes					Crocodylia— Caiman, alligators	4	8	
	Tarpon, bonefish	1	4		Aves	Sphenisciformes— Penguins	1	1	
	Anguilliformes— Eels, morays	10	22		Mammalia	Pinnipedia—Seals, sea lions, walrus	46		
	Osteoglossiformes— Arawana, arapaima	3	6			Cetacea—Whales, dolphins	2	17	
	Salmoniformes— Trouts	4	36		Cnidaria	Anthozoa—Corals, anemones	2	9	
	Gadiformes—Cod, pollack	3	23		Annelida	Polychaeta—Marine worms	40	numerous	
	Lophiiformes— Anglerfish	3	3		Arthropoda	Crustacea—Lobsters, shrimps, crabs, isopods, etc.	6	300	
	Clupeiformes— Herring	2	39			Archinida—Horseshoe crab	15	89	
	Cypriniformes— Minnows, carp, cavefish, piranha, tetra	6	157		Mollusca	Gastropoda—Snails	1	35	
	Gymnotiformes— Knife-fish, electric eels	3	5			Cephalopoda—Octopus, nautilus, cuttlefish	3	50	
	Siluriformes— Catfish	6	26		Echinodermata	Astroidea—Starfish	5	32	
	Characiformes— Piranha, cavefish	4	380			Holothuroidea—Sea cucumbers	9	75	
	Batrachoidiformes— Toadfishes	3	41			Echinoidea—Sea urchins	3	9	
	Atheriniformes— Plats, swordtails, killifish, silver-sides, needlefish, flyingfish, guppies	6	516		New York Aquarium Census		4	30	
	Beryciformes— Squirlfishes, flashlight fish	8	23				392	3,628+	
					NYZS Total Census				
							1,221	9,083+	



# WILDLIFE CONSERVATION INTERNATIONAL



Since its first field conservation project in 1897, the New York Zoological Society has gathered essential biological data about endangered species and ecosystems, initiated and promoted important wildlife laws, helped create more than 70 wildlife parks around the world, and formulated conservation strategies in many crucial areas. Wildlife Conservation International (WCI), the Society's field science division, supported 125 projects in 40 countries during the past year, coordinated by 18 staff scientists working in New York, Africa, the Americas, and Asia. Eight wildlife parks and reserves involving WCI scientific and administrative efforts were declared or projected in Belize, Peru, Brazil, Venezuela, Central African Republic, Congo, Tanzania, and China. In February 1990, Dr. John . Robinson, former director of the Program for Studies in Tropical Conservation at the University of Florida, was named director of WCI. Stressing the need to strengthen regional programs and work more closely with other non-governmental organizations, academic institutions, and government agencies, Dr. Robinson restated WCI's basic mission "to conserve species and biological processes, while recognizing the imperative of human needs."

Peruvian Cormorants at  
Punta San Juan in Peru



### East African Savannas

As Chairman of the African Elephant and Rhino Specialist Group, Regional Coordinator David Western provided leadership and data that was instrumental in achieving an international moratorium on the ivory trade. Following bans by the U.S., Japan, and several European countries, the Convention for International Trade in Endangered Species (CITES) raised the African elephant to endangered status. Almost immediately, the international ivory trade came to a standstill. Much work remains to be done in implementing the conservation plan of the African Elephant Conservation Coordinating Group (AECCG).

According to Chris Gakahu's latest continental survey, black rhino numbers have now fallen to about 3,000. With the hope of stabilizing the population at about 2,500, WCI's Rhino Rescue Fund contributed to several highly successful sanctuaries in Kenya, including Nairobi National Park, monitored by Timothy Oloo, which now has 60 rhinos; Lake Nakuru Park, with its

Confiscated tusks in Nairobi's Ivory Storeroom reflect the elephant's plight.

19 translocated rhinos monitored by Fred Waweru; and Aberdares National Park, with 37 rhinos monitored by Helen Gichohi.

Waweru is also conducting a government-sponsored survey of black rhinos in Tanzania that recommends a sanctuary there. A new initiative coordinated by Gichohi seeks to create conservation zones south of Nairobi National Park to protect wildlife migration routes in an area of commercial development under the World Bank. Her study on the effects of fire and fencing on the park, and Lucy Muthee's on the impact of tourism in Masai Mara both recognize the interdependence of wildlife and humans.

Working with Tanzanian scientists and park managers, Patricia Mochlman expanded conservation monitoring programs beyond the Ngorongoro

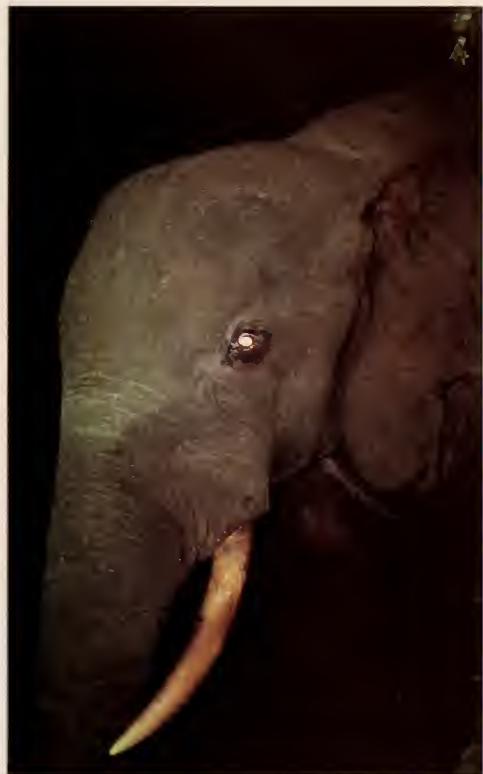
Conservation Area Authority to Lake Manyara, Tarangire, and Ruaha National Parks. These programs serve as early warning systems for ecological problems of all kinds. In Somalia, collaborating with wildlife authorities, researchers, and local nomadic herders, Moehlman mounted a last-ditch effort to save the dwindling wild ass population. She is developing a conservation program and reserve for the species in the rugged Nugaal Valley.

Chris Hillman initiated an integrated land-use planning project in and around Ethiopia's Awash National Park, while continuing to implement the Bale Mountain management plan and train Ethiopian researchers and government personnel. His work signals hope for effective conservation of Ethiopia's unique natural areas and wildlife, despite the country's overwhelming problems.

#### African Forests

In Uganda's Kibale Forest, Andrew Johns used U.S. and European development grants to expand the basic infrastructure and range of activities. Established scientists like John Kasenene and Isabirye Basuta continued to build on their long-term research, while new opportunities opened up for dozens of students from Makerere University. Community education and reforestation efforts around the reserve were coordinated by Marijke Steenbeck, and forest management and tourism development plans are being devised by Johns and his staff for submission to both government and international agencies.

Tourism has already aided conservation in the forests of Rwanda. Amy Vedder helped coordinate the latest mountain gorilla census there, which recorded an increase to more than 320 animals from a low of 260 in 1979, before the current tourism, education, and management program began. In southern Rwanda, the well-developed trail network and healthy primate populations of the Nyungwe Forest attracted nearly 5,000 visitors last year and helped generate further government support for conservation. Forest inventory work revealed the presence of the owl-faced monkey, a rare and secretive primate never before



Photographs triggered by electric eye help census forest elephants in Korup National Park.

noted east of the Rift Valley system.

Elephant surveys conducted over a six-country area by WCI teams under Richard Barnes found that nearly 250,000 elephants remain in the lowland rain forests of equatorial Africa. These populations are increasingly vulnerable to the same poaching pressure that has decimated savanna elephants.

The elephant surveys revealed other problems in the region. Reports of widespread poaching, gold-mining, and even permanent settlements in Zaire's



Dismantling a manatee trap in Ivory Coast.

#### **It's A Fish, It's A Cow, It's A Manatee**

In the West African nation of Côte d'Ivoire (Ivory Coast), WCI is working to save the manatee, a large marine mammal sometimes called the sea cow. Research Fellow Kouadio Akoi uses public education and information to generate support for manatee conservation in local communities near the coastal lagoons

where manatees live and feed. Akoi has produced manatee tee shirts and has also run conservation education workshops for local teachers. One of his tools is a cartoon book that he wrote and drew himself. In this installment the manatees are crying and in a panic because one of their babies is missing. A local friend of nature comes to their aid. Akoi is also working with manatee poachers to help them find alternative sources of food and income, and to persuade them to dismantle their traps, as they are doing here.



Maiko National Park brought John Hart and Claude Sikubwabu from their Ituri Forest base to the little-known park. There, they confirmed the problems, but also identified huge blocks of unexplored wilderness within the boundaries of the reserve. Proposals were made to the government and international agencies for increased assistance to Maiko.

Surveys by Mike Fay and Marcellin Agnagna in northern Congo Republic revealed an almost totally undisturbed area of several thousand square kilometers of rain forest, with extremely dense populations of elephants, gorillas, chimps, and other fauna. In neighboring Cameroon, Marcel Alers found more signs of disturbance, and equally rich wildlife populations. Even more intriguing, the two areas are adjacent to the already established Dzanga-Sangha Reserve in the Central African Republic, raising the possibility that a tri-national reserve might be established. To this end, WCI Assistant Director and African Forests Regional Coordinator Bill Weber has been working with officials of the governments concerned, and with representatives of other interested conservation and development organizations. The more than 6,000-square-mile area would be one of the largest rain-forest reserves in the world.

In southwestern Cameroon, James Powell made remarkable progress during his first year in Korup National Park. From his recently completed field research station, he began work on systematic biological surveys of key species and vegetation. Research Fellows John Payne and Ann Edwards are looking at duiker and primate densities, while several former hunters from the neighboring village of Ikenge have redirected their skills toward a better understanding of the Korup ecosystem.

Hunting is one of the human activities being studied by Sally Lahm for its impact on wildlife in northeastern Gabon. Lee White's study of the impact of logging on elephants, gorillas, and other species in Gabon's Lope Reserve addresses the pervasive challenge of human-wildlife interactions.

Kouadio Akoi's work on manatee conservation and coastal zone management in Ivory Coast has produced several documents for both planning and educational

## WILDLIFE CONSERVATION INTERNATIONAL

purposes, including a full-length action comic in which a biologist uses radiotelemetry to foil a gang of poachers! (see story on page 38).

### Central America and the Caribbean

Coastal and forest projects stretched from Mexico and Belize to Panama under Regional Coordinator Archie Carr III. The work of long-time WCI Research Fellow Janet Gibson moved toward the protection of Glover's Reef, a uniquely developed atoll off the central section of the 150-mile-long Belize Barrier Reef. Middle Cay island was purchased to serve as an administrative research-training center for WCI's efforts. Gibson used a reef management workshop, attended by international experts, including the director of the Great Barrier Reef Management Authority of Australia, to further the development of a management plan for the entire barrier reef. The significance of her work was recognized when she became president of the Belize Audubon Society and was named recipient of the prestigious Goldman Award for conservation excellence.

Other coastal initiatives include Didier Chacon's survey in Costa Rica of the status of tarpon, a large sport fish that is important to the local economy. Its life in estuaries is affected by inland deforestation and run-off pollution. Elsewhere in Costa Rica, ecologist James Barborak has been assigned to work on establishing a recently designated "wildlife corridor" between Tortuguero National Park and the Colorado River Wildlife Refuge. Eventually, it is hoped that these areas may become part of an international park linking vast coastal and lowland forest tracts in Nicaragua and Costa Rica.

In Panama, Anne and Peter Meylan resumed their work in the Bocas del Toro, on the Atlantic coast near Costa Rica, a critical area in the life cycles of four species of sea turtle. A plan to improve management of the Bastimentos Marine National Park was developed by the Meylans and Dr. Carr to be implemented by Panama's leading private conservation group, Asociacion Nacional para la Conservacion de la Naturaleza (ANCON).

Forest projects in the region focused on wilderness

areas around two ancient Mayan sites: Caracol in Belize, where Bruce Miller is developing plans for park management, and Tikal in Guatemala, where Howard Quigley, Milton Cabrera, and Maria José Gonzalez are studying conservation needs. Several of the coastal and forest projects will ultimately be incorporated in an overall WCI program called Paseo Pantera (Path of the Panther), which will link key conservation areas throughout Central America. Funds were being sought from the U.S. Agency for International Development (USAID) toward this regional effort, in cooperation with the Caribbean Conservation Corporation (CCC).

Long-term efforts are also underway in the lowland forests of Calakmul and Lacandona, where WCI supports several Mexican biologists. Mexico has lost 80 percent of its forests in recent years, so non-governmental conservation organizations are hoping for federal support to protect these two areas. Management plans are being formulated, while basic ecological information is being supplied by Ignacio March and Marcelo Aranda in Calakmul and Eduardo Elias Iñigo and Rodrigo Medellín in Lacandona.

### Tropical South America

Under Regional Coordinator Dr. Stuart Strahl, WCI sponsored more than 20 projects in Venezuela. Important agreements were signed with both the National Parks Institute and the Ministry of the Environment to improve conservation measures for wildlands and parks. Several joint projects with the private conservation organization EcoNatura focused on the Nichare River Basin as part of a long-term effort in the five-million-hectare Caura Forest Reserve. Included were wildlife surveys and an ethnobiological study of Markiritare (Yekuana) Indians, and the doctoral research of Hernan Castellanos on spider monkeys, the latter also supported by the Herbert Whitley Trust and the Paignton Zoo in England.

In the Choco Province of Colombia, Heidi Rubio is studying the use of wildlife by Enbera Indians in Utria National Park, co-sponsored by Fundacion Natura. WCI also helped sponsor the Latin American Zoologists' Congress in Cartegena, providing funds for Colombian students to attend the event. In Ecuador,

# WILDLIFE CONSERVATION INTERNATIONAL

Luis Suárez and Patricio Mena began a major project on the conservation of cloud forests sponsored by EcoCiencia and funded by the USAID Biodiversity program.

A 5,100-square-mile state reserve, the Ecological Station of Lake Mamiraua in Amazonas, was declared in March 1990 as a result of Marcio Ayres' work to save the endangered flooded forests of the Amazon. It is the largest such protected area for this critical habitat type in Brazil. Protection measures for other areas are being explored. In southern Brazil, Sandra Pacagnella began a WCI-sponsored study of the highly endangered black-fronted piping guan.

Charles Munn continued his landmark research on the ecology and conservation of macaws and parrots in Peru's Manu National Park, working jointly with the Asociacion para la Conservacion de la Selva Sur

(ACSS). Management of critical areas of the southern Amazon region, including Manu and the newly declared Tambopata Reserve, is improving through their efforts.

## Temperate South America

Scrutiny of the continent's southern cone intensified under the direction of NYZS General Director William Conway, with emphasis on creating a unified and comprehensive program for wildlife conservation on Argentina's long Patagonian coastline. While proceeding with his long-term studies of southern elephant seals and southern sea lions, Claudio Campagna began an aerial survey of colonial mammals and birds along the entire coast. At Punta Tombo, with the help of Dr. Conway and student assistants, Dee Boersma produced a plan for the coastal management of Chubut Province that was presented to the provincial government. The plan would expand the reserve at Punta Tombo and make it part of a coastal reserve system. From his

Humboldt penguins and southern  
fur seals at Punta San Juan, Peru.



headquarters at the Peninsula Valdes Research Station, Graham Harris monitored oil drilling and transport along the coast, managed the project to protect wildlife at Punta Leon, and founded, with Campagna and others, the Fundacion Patagonia Natural, a conservation organization that is already a force in surveying oil activities, opposing more lenient hunting laws, and educating the public.

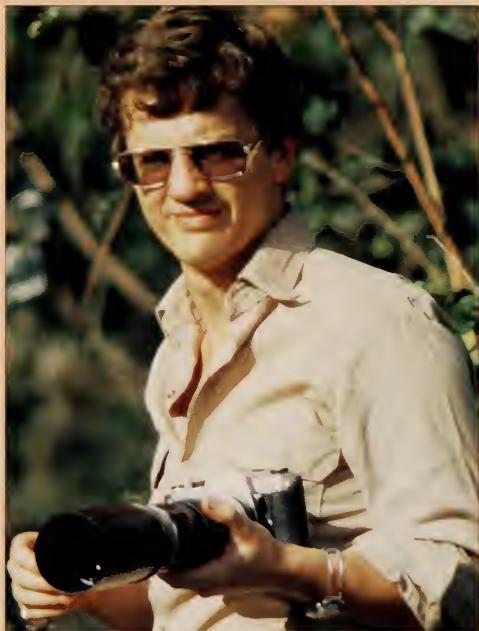
From Andrew Taber's work in the Gran Chaco region of Paraguay, it has become clear that the Chacoan peccary, with about 6,000 animals remaining, should now be considered endangered. Plans for protecting the species and its harsh habitat in Argentina and Bolivia as well as Paraguay were presented by Taber and his colleagues. Grantee Guy Cox initiated wildlife surveys in Bolivian National Parks as part of a national conservation effort.

### Tropical Asia

Regional Coordinator Mary Pearl and NYZS Ornithology Chairman Don Bruning traveled to Papua New Guinea in July 1989 to meet with government officials and members of the Research and Conservation Foundation, as well as with potential regional sources of support. A plan for the next several years' activities with the foundation were mapped out, and an alliance was formed with the Foundation for Peoples of the South Pacific, an active 25-year-old grassroots organization. With the PNG Ambassador to the United States, the Honorable Margaret Taylor, a consortium of U.S. conservation organizations was formed to present PNG conservation concerns to the World Bank and other international entities.

At Crater Mountain in the Western Highlands of Papua New Guinea, Andrew Mack and Debra Wright began their dwarf cassowary research, and WCI began renovations on the modest tourist lodge there. The Foundation for Peoples of the South Pacific will bring their project GROW, a garden plot intensification program, to the village of Ubaigubi, adjacent to the protected area. WCI hired its first Papuan Research Fellow, Lawong Balun, to study forest regeneration near the Forest College at Bololo, as part of the continued emphasis on professional training. WCI remains the only international conservation organization with an ongoing research presence in this extraordinary biome.

Cooperating with Sarawak's Forestry Department, Liz Bennett has been conducting wildlife surveys



New WCI Director John Robinson in Venezuela.

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### New Directions, New Director

On February 1, 1990, Dr. John G. Robinson joined the staff of Wildlife Conservation International as its first full-time director. His appointment follows the ground-breaking efforts of Drs. George Schaller and David Western, who had been dividing their time between New York and the field. Both have returned to lead major field programs on WCI's behalf. Dr. Robinson is well known for his work in tropical conservation and primatology and as the founder and director, since 1980, of the Program for Studies in Tropical Conservation at the University of Florida in Gainesville.

In late March, Dr. Robinson presided over a five-day meeting of field and headquarters staff in Salisbury, Connecticut. WCI scientists working in Asia, Africa, and the

Americas, along with administrative, fund-raising, and public relations personnel, discussed the future of the program, its organization, priorities, goals, and public image as well as specific problems and plans in WCI's seven global areas of activity.

While responding to short-term crises involving endangered species, WCI will strengthen, under Dr. Robinson's leadership, its long-term commitment to understanding biological communities and their responses to human activities and to training scientists and other professionals for crucial conservation roles in their own countries. Currently, more than half of WCI's projects around the world are conducted by nationals of the countries in which they work.



Lake Manyara elephants.

#### Reserved For The Future

As an important part of its overall program, WCI targets biologically important areas for national or international protection. More than 70 parks and reserves have thus been established in WCI's 93-year history. During the past year WCI has initiated efforts to set aside several important parcels of land as parks and reserves, including the following:

**CENTRAL AMERICA** Middle Cay - 15-acre island...off the Caribbean country of Belize...part of most biologically diverse coral reef in the New World...breeding ground for snappers and groupers...home to dolphins, squirrelfish, moray eels...relatively intact corals and marine life... saved by WCI from commercial development...first step toward protection of larger Glover's Reef, through the efforts of WCI Research Fellow Janet Gibson.

**SOUTH AMERICA** Tambopata-Candamo Reserve - 5,800 square miles...on the eastern slopes of the Andes in Peru... has the greatest diversity of parrots in the world...inhabited by endangered species of macaws and many other rare

birds...also by jaguars, giant river otters, spectacled bears, monkeys...one of few remaining areas of virgin rain forest...declared a national reserve, based on recommendations of WCI Associate Research Zoologist Charles Munn.

**SOUTH AMERICA** Lake Mamiraua Ecological Station - 5,163 square miles...in the upper Amazon region of northern Brazil...the flooded forests of the Amazon River basin may be the most biologically diverse region on earth...home to unique animals...red-faced uakaris, howler monkeys, sloths, reptiles, birds...breeding grounds for important Amazonian fish...reserve decreed by the state of Amazonas...based on the research and recommendations of WCI Associate Research Zoologist Marcio Ayres.

**SOUTH AMERICA** Guacharo National Park Extension - 2,000 square miles in the Mata de Mingo range along the northeast coast of Venezuela...important wintering site for the oilbird...source of over 30 watercourses... declared December 1989 on recommendations and proposal by WCI researchers Roberto Roca and Patricia Gutierrez, with support from Fundación para la Defensa de la

#### Naturaleza (FUDENA).

**ASIA** Chang Tang Reserve - 100,000 square-mile plateau...15,000 feet above sea level...in the Tibet Autonomous Region of China...will be the largest protected area in the world...remarkable for its large mammals...wild yaks, Tibetan antelopes, snow leopards, Tibetan bears, lynxes...seasonal migration of thousands of wild asses...remote, undisturbed, untouched...agreements to declare the reserve negotiated but not yet final...crucial role played by WCI Director for Science George Schaller.

**EAST AFRICA** Lake Manyara Corridor - 2,500 acres...in Tanzania...links Lake Manyara National Park to the Marang Forest Reserve...serves as important path for elephants migrating between protected areas...effectively doubles available feeding territory, protecting nearby

farms...purchased by WCI for the Tanzanian Parks Department.

**CENTRAL AFRICA** Nouabale Reserve - 4,000 square miles...in Congo Republic...very remote...elephant population density is four times as high as less remote parts of Africa...also home to chimpanzees, lowland gorillas, buffalos, leopards, giant hogs...reserve proposed but not yet declared...adjacent to newly declared Dzanga-Sangha National Park in the Central African Republic and to a proposed reserve in Cameroon...good prospects for a very large tri-national protected area.

Marcio Ayres in the area of Lake Mamiraua.





throughout the unexplored highlands of Malaysian Borneo. She and her Malaysian colleagues have also begun to investigate the effects of sport and subsistence hunting on animals in the forest, compiling data that is being used by the Forest Department as they consider new laws to govern hunting. Zainuddin Dahaban began a study of the effect of logging on wildlife, and in Sabah, Dr. Bennett helped Ramesh Boonratana set up a study of proboscis monkeys in the vast wetlands habitat known as the Kuala Kinabatangan. His research will lead to recommendations for a new protected area there.

In Indonesian Borneo, Mark Leighton's research on tropical forest plant and animal interactions continued at Gunung Palung, West Kalimantan, where he ran a training program sponsored by WCI, UNESCO, and Man and the Biosphere for wildlife managers throughout Southeast Asia, in addition to providing long-term training for Indonesian graduate students.

Asian mainland projects included Mahidol University biology professor Sampoad Srikosamatara's survey of the rare and magnificent large hoofed mammals of

**Dr. George Schaller, WCI's director for science, with snow leopard at the Bronx Zoo's Himalayan Highlands.**

Thailand's forests, and Ullas Karanth and Mel Sunquist's study of the unusual abundance of predators and prey in southern India's Nagarhole National Park.

#### Temperate Asia

In Beijing, China, WCI Director for Science George Schaller reached an agreement on a three-year study of Tibetan antelope, wild yak, and other unique wildlife in northwestern Tibet. In this area, the Chang Tang, Schaller and the Tibet Institute of Plateau Biology have promoted the establishment of a 125,000-square-mile reserve, which would be the largest protected territory in the world. Except for a few herdsmen around the periphery, the region is uninhabited, and represents one of the last great undamaged ecosystems. Schaller also worked in Mongolia with the Mongolian Society for conservation of Nature and Environment on a study of Gobi bear in the Great Gobi National Park, and on a study of snow leopards in the central Altai.

# WILDLIFE CONSERVATION INTERNATIONAL

## Projects Supported by Wildlife Conservation International

### Central America and the Caribbean

1. Belize Barrier Reef conservation and management, Belize. Jacque Carter and Janet Gibson.
2. Tropical forest reserve planning in Caracol, Belize. Bruce Miller.
3. Population size and structure of Morelet's crocodiles in El Petén, Guatemala. Oscar Lara.
4. Survey of conservation needs in El Petén, Guatemala. Howard Quigley, Milton Cabrera, and María-José González.
5. Pygmy raccoon and curassow survey, Mexico. Martha Suárez.
6. Forest fragmentation and raptor conservation, Mexico. Eduardo Elías Iñigo.
7. Jaguar survey, Calakmul, Mexico. Marcelo Aranda.
8. Ecology of the horned guan, Chiapas, Mexico. Fernando Gonzalez-García.
9. White-lipped peccary study and habitat evaluation, Calakmul, Mexico. Ignacio J. March.
10. Effects of perturbation on a tropical mammal community, Mexico. Rodrigo Medellín.
11. Conservation of the Central American river turtle, Mexico, Belize, and Guatemala. John Polisar and Wayne King.
12. Honduras cracids, Honduras. Sergio José Midence.
13. Ecology and migration of marine turtles, Panama. Anne and Peter Meylan.
14. Tarpon status and marine conservation, Costa Rica. Didier Chacon and Archie Carr III.
15. Wildlife corridor, Costa Rica. James Barborak.
16. Breeding biology of the

Bahamas parrot, Bahamas. Rosemarie Gnam.

### Tropical South America

17. Orinoco crocodile conservation, Venezuela. John Thorbjarnarson and Tomas Blohm.
18. Guan, curassow, and oilbird studies, Venezuela. Stuart Strahl.
19. Ethnobiology and rainforest conservation, Venezuela. Isaac Goldstein and Stuart Strahl.
20. Flamingos and coastal habitat conservation, Venezuela. Miguelino Lentino, Marylou Goodwin, and Stuart Strahl.
21. Oilbird ecology and conservation, Venezuela. Roberto Roca and Patricia Gutierrez.
22. Margarita Island Parrot Conservation, Venezuela. Pro Vita Animalium and the Ministry of the Environment.
23. Human impact on wildlife, Venezuela. José Lorenzo Silva.
24. Spectacled bear survey, Venezuela. Isaac Goldstein and Pro Vita Animalium.
25. Andean ecosystem conservation and planning, Venezuela. Edgard Yerena.
26. Henri Pittier National Park conservation program, Venezuela. Amigos Científicos del Parco Nacional Henri Pittier.
27. Private landowner conservation initiative, Venezuela. Gilberto Rios.
28. Comprehensive parrot survey, Venezuela. Stuart Strahl and Philip Desenne.
29. Venezuelan student conservation program, Venezuela. Econatura.
30. Regional student grants programs, Venezuela, Colombia, Ecuador, and Peru. Stuart Strahl and Econatura.
31. Non-governmental organization support, Ecuador. Lisa Naughton.
32. Field research and conservation in cloud forests, Ecuador. Luis Suárez and Patricio Mena.
33. Curassow surveys and hunter interviews, Ecuador. Ruth Garces.
34. Pinzon Island giant tortoise conservation, Galapagos Islands, Ecuador. Linda Cayot and Luis Calvopina.
35. Ecological impact of rubber-tapping in Acre Province, Brazil. Marcio Ayres and Eduardo Martins de Souza.
36. Primate studies in flooded forests and conservation coordination, Brazil. Marcio Ayres.
37. Population estimate and ecological data, black-fronted piping guan, Brazil. Sandra Pacagnella.
38. Ecology of Amazon parrots and parks recommendations, Peru. Charles Munn.
39. South American fur seal ecology and conservation, Peru. Patricia Majluf.
40. Effects of hunting, Manu National Park, Peru. Carol Mitchell and Ernesto Raez-Luna.
41. Avifauna survey and conservation, Colombia. Luis Miguel Renjifo.
42. IUCN Parrot Group support. Donald Bruning.
43. IUCN Cracidae Group support. Stuart Strahl.
44. Regional shortcourses in conservation biology. Stuart Strahl and Luis Suárez.

### Temperate South America

45. Ecology and conservation of the Chacoan peccary, Paraguay. Andrew Taber.
46. Flamingo habitat conservation, Chile. Mario Parada and Alfonso Glade.
47. Regional flamingo conservation, Chile, Bolivia, and Argentina. Mario Parada and Juan Pablo Reyes.
48. Humboldt penguin conservation, Chile. Alfonso Glade.

49. Sea lion ecology and coastal management, Argentina. Claudio Campagna.

50. Support for the Department of Conservation, Chubut Province, Argentina. William Conway.

51. Conservation of Punta Leon seabird and mammal colonies, Argentina. Guillermo Harris, Claudio Campagna, and Pablo Yorio.

52. Oiled penguins, coastal conservation, Argentina. ECOBIOS.

53. Magellanic penguins at Punta Tombo, Argentina. P. Dee Boersma and Pablo Yorio.

54. Valdes Research Station and conservation coordination, Argentina. Guillermo Harris.

55. Flamingo and seabird surveys, Argentina. Guillermo Harris.

56. Conservation of Patagonian cormorant colonies, Argentina. Gabriel Punta.

### East African Savannas

57. Capital improvements, Amboseli National Park, Kenya. Government of Kenya.
58. Zoological monitoring, Amboseli National Park, Kenya. David Western.
59. Nairobi National Park training and monitoring, Kenya. Helen Gichohi.
60. Black rhino translocation studies, Lake Nakuru National Park, Kenya. Fred Waweru.
61. General support for the Wildlife Clubs of Kenya. David Western.
62. Tourist impact on wildlife, Masai Mara, Kenya. Chris Gakahu and Wesley Henry.
63. Jackal ecology and Tanzanian conservation, Tanzania. Patricia Moehlman.
64. Ngorongoro Crater monitoring and training, Tanzania. Karim Hirji, Juma Kayera, and Patricia Moehlman.

65. Conservation status of forest birds in the Uzungwa Mountains, Tanzania. David Moyer.

66. Graduate training in conservation biology, Tanzania. Patricia Moehlman.

67. Monitoring and conservation of Ruaha National Park, Tanzania. David Babu, Karim Hirji, and Patricia Moehlman.

68. Lake Manyara National Park expansion and monitoring, Tanzania. Patricia Moehlman.

69. Tarangire National Park conservation and monitoring, Tanzania. Patricia Moehlman.

70. Aspects of the ecology of the Oribi, Serengeti National Park, Tanzania. Simon A.R. Mduma.

71. Training fellowship, Tanzania/U.S.A. Emmanuel Chausi.

72. Government Advisor in wildlife conservation, Ethiopia. Jesse C. Hillman.

73. Simien fox conservation and ecology, Ethiopia. C. Sillero-Zubiri and M.D. Gottelli.

74. Somali wild ass conservation, Somalia. Patricia Moehlman.

75. Rhino Rescue Fund. David Western.

76. Ivory economics and trade analysis. Stephen Cobb and David Western.

77. African Elephant Action Plan. David Western.

78. Support for African Elephant and Rhino Group (IUCN). Christopher Gakahu and David Western.

79. African elephant ivory genetic fingerprinting. John Patton and Nick Georgiadis.

80. Rhino genetics studies. Don Melnick.

**African Forests**

81. Kibale Forest Project, Uganda. John Kasenene, Andrew Johns, and Makerere University.

82. Ecology and behavior of chimpanzees, Uganda. Gilbert Isabirye Basuta.

83. Potential economic importance of wild coffee, Uganda. John Kasenene.

84. Habitat disturbance analysis, Makokou Reserve, Gabon. Sally Lahm.

85. Impact of logging, Lope Reserve, Gabon. Lee White.

86. Primate conservation and education, Tiwi Island, Sierra Leone. John Oates.

87. Manatees and coastal conservation, Ivory Coast. Kouadio Akoï.

88. Ecology of lowland gorillas, Central African Republic. Richard Carroll and Michael Fay.

89. Forest surveys—Regional networking and training, Congo, Gabon, and Zaire. William Weber.

90. Forest elephant survey, Gabon, Congo, Cameroon, Equatorial Guinea, Central African Republic, and Zaire. Richard Barnes/IUCN.

91. Forest elephant, ivory trade analysis. Stephen Cobb and David Western.

92. Okapi ecology and behavior, parks planning, Ituri Forest, Zaire. Terese and John Hart.

93. Nyungwe Forest conservation, Rwanda. Rob Clausen and Amy Vedder.

94. Animal seed dispersers as key elements for conservation of tropical forests, Nyungwe Forest, Rwanda. Joseph Mvukiywami, Amy Vedder, and Kanyogo kf Kajondo.

95. Status of elephants, Sancthou Reserve, Cameroon. Martin Tchamba.

96. Black rhino status. Cameroon. Martin Tchamba.

97. Korup Forest Project, Cameroon. James Powell and William Weber.

98. Primate distribution, Korup Forest, Cameroon. Ann Edwards.

99. Mammal abundance, Korup Forest, Cameroon. John Payne.

100. Tana River primate conservation, Kenya. Odhiambo Ochiago.

101. Distribution of the drill, Nigeria. Elizabeth Gadsby.

**Temperate Asia**

102. Wildlife surveys and reserve planning, Tibetan Plateau, China. George Schaller.

103. Wildlife research, Mongolia. George Schaller, A. Tulgat, and G. Amarsaanaa.

104. Guizhou golden monkey conservation and education, China. Xie Jiahua, William Bleisch, and Mary Pearl.

**Tropical Asia/and the Pacific**

105. Lion-tailed macaque conservation, India. Ajith Kumar.

106. Tigers and other carnivores in Nagarahole National Park, India. Ullas Karanth.

107. Carnivore ecology, Huai Kha Kaheng Sanctuary, Thailand. Alan Rabinowitz.

108. Conservation training and coordination, Thailand. Warren Brockelman.

109. Research and training in conservation biology, Thailand. Sampoad Sriksamatara.

110. Proboscis monkey, wildlife surveys, and logging impact, Sarawak, Malaysia. Elizabeth Bennett.

111. Proboscis monkey conservation, Malaysia. Ramesh Boonratana.

112. Langur conservation, Sabah, Malaysia. Arthur Mitchell.

113. Tropical ecology and training workshops, West Kalimantan, Borneo, Indonesia. Mark Leighton.

114. Support for national conservation organization, Papua New Guinea. Donald Bruning.

115. Soil seed banks, Bulolo Valley, Papua New Guinea. Lawong Balun.

116. Tari Gap conservation planning, Papua New Guinea. Ben Probert.

117. Dwarf cassowary conservation and reserve planning, Papua New Guinea. Andrew Mack and Debra Wright.

118. Guam rail introduction, Guam. Stuart Pimm.

119. Regional training, Southeast Asia. Mary Pearl, Mark Leighton, Elizabeth Bennett, and Alan Rabinowitz.

**North America**

120. Humpback whale status and conservation, Hawaii, U.S.A. Deborah Glockner-Ferrari and Mark Ferrari.

121. Black-footed ferret reward campaign, U.S.A. U.S. Fish and Wildlife Service.

**Education and Training**

122. Environmental education "Outreach." James Connor.

123. Noyes Foundation Fellowships. Claudio Campagna, Argentina; John Kasenene, Uganda; Patricia Majluf, Peru; R.B.M. Senozota, Tanzania; Sompoad Sriksamatara, Thailand.

124. Pan American Wildlife Education Conference, Venezuela. Annette Berkovits.

125. Pew Charitable Trusts Field Training Grants. William Weber.



# ENVIRONMENTAL EDUCATION

Educational programs at the Bronx Zoo, New York Aquarium, and Central Park Zoo far exceed the Society's original mandate simply "to instruct the public." Courses and published materials fulfill basic science curriculum needs for school districts throughout the New York City area. Last year, 82,000 students, from pre-school through adult, attended 2,800 class sessions at the three institutions. Programs such as the Bronx Zoo's *Wildlife Inquiry Through Zoo Education* reach national and international audiences. Teachers from around the world are trained by Zoo staff to use zoos as living resources, and many new habitat exhibitions incorporate built-in classrooms for observing wildlife behavior and ecology. In January, the Society's global involvement culminated in a conservation education conference in Caracas, Venezuela, organized primarily by the Bronx Zoo Education Department.

## ENVIRONMENTAL EDUCATION



### Bronx Zoo Education

In January 1990, the First Pan American Congress on Conservation of Wildlife through Education, was convened in Caracas, Venezuela by the Bronx Zoo Education Department and Wildlife Conservation International, the International Association of Zoo Educators (IZE), and the Venezuelan government, with the support of many other sponsoring organizations. The five-day congress marked the first time educators and biologists from throughout the western hemisphere had gathered to consider education as a primary tool for conservation.

There were 260 participants, including educators, biologists, media specialists, and staff from zoos, aquariums, wildlife reserves, and universities. Eighty were Latin American professionals on full scholarships secured through the efforts of NYZS. Master teachers from eleven U.S. states were supported by the National Science Foundation. Some 163 different types of

**Instructor Scott Silver teaches animal handling to high school students.**

organizations and 28 countries were represented.

The objectives of the Congress were to: (a) examine priorities and assumptions in conservation education; (b) identify key audiences; (c) come up with guidelines for effective programs; and (d) share strategies for success.

Topics addressed included: educational priorities and strategies for working with populations around parks and reserves; problems of dealing with rural and urban audiences; and conservation education in zoological parks. Traditional papers and panel discussions were complemented by workshops providing practical hands-on experience. Techniques for the production of low-budget materials and displays were discussed in depth. Several committees were formed to continue the work of the Congress.

The Newsletter Networking Group is planning to

produce a bi-lingual (English, Spanish) conservation education newsletter. The Materials Networking Group is exploring the establishment of a conservation education materials center and a database listing programs and training opportunities. A Latin American Zoo Educators' Group is making plans for future meetings, and several participating teachers have already started a pen-pal student network with several Latin American countries. Organizations from the Dominican Republic, Colombia, Cuba, and Panama have requested assistance with teacher training, and many mini-networks within and between countries and institutions have gotten underway.

In the national arena, more and more secondary level science teachers are being trained to incorporate *Survival Strategies*, the second module of The Bronx Zoo developed Wildlife Inquiry Through Zoo Education (W.I.Z.E.). Since it received recognition from the U.S. Department of Education in 1988, *Survival Strategies* has been widely sought by schools nationwide as a solution to the crisis in science literacy. Funds from the National Diffusion Network enabled the Zoo Education Department to conduct in-depth training for teachers in New York, Louisiana, Kentucky, Pennsylvania, Kansas, California, Iowa, Oregon, Missouri, Washington, and Georgia. Over 10,000 new students will be reached as a result. In addition, awareness presentations were made in New Jersey, Utah, Tennessee, Ohio, and Virginia.

Because *Survival Strategies* is viewed as a highly motivational instructional resource for special populations, Zoo Education staff were invited to speak at such gatherings as the New Orleans National Conference on Women and Minorities, the United Federation of Teachers Arts and Science Conference, and the American Association for the Advancement of Science Conference. In the spring of 1990 the John Hopkins University Center for Research on Effective Schooling for Disadvantaged Students selected *Survival Strategies* from over 200 programs for inclusion in its special report of promising programs for students in the middle grades. Locally, the Westchester County Archdiocese sponsored training for teachers from ten area schools.



Students using W.I.Z.E. at Washington Park Zoo in Portland, Oregon.

#### W.I.Z.E-ing Up

It is a common complaint. Secondary school students in the United States are woefully undereducated in the sciences. The Bronx Zoo Education Department is aggressively addressing this grave problem. In fact, Don Lisoury, Dissemination Coordinator, Project W.I.Z.E., is coordinating the improvement of science education across the country through an extensive outreach program originating in the Bronx.

Wildlife Inquiry through Zoo Education (W.I.Z.E.) is an intermediate and secondary school curriculum created by the Bronx Zoo education staff in two modules: Diversity of Lifestyles and Survival Strategies. It is designed to promote the use of outside resources, particularly zoos, in

learning about basic biology, ecology, and conservation. W.I.Z.E was developed with a grant from the National Science Foundation and has been validated for national use by the National Diffusion Network, a part of the U.S. Department of Education.

This past year, Lisoury held 20 different W.I.Z.E. training sessions for more than 200 teachers across the country, from New York to Oregon, and from Iowa to Florida. In most cases the sessions are held at a local zoo, so that public school and zoo educators can actually see how zoo animals and habitats can be incorporated into the teaching of science. Teachers are also encouraged to use other resources, including aquariums and nature centers. In Vermont some classes learn field biology techniques in a cow pasture. In Louisiana teachers might make use of the nearby bayous.

(continued on next page)



**Donald Lisowy (right) confers with teacher at the National Association of Science Teachers convention in Seattle.**

(continued from page 49)

"There's nothing else like this," says Lisowy, "where conservation education is brought right into the classroom. It's a curriculum that immerses kids in science. They really come to understand conservation by playing roles, like field biologist, park warden or animal curator. And it's not just a one-shot visit to the zoo. It makes the zoo a fundamental part of teaching science in school."

In Baton Rouge, Louisiana, Lisowy held training sessions for local high school teachers, including a group of Cajun teachers. Louisiana has one of the poorest education performance records in the country, and one of the highest dropout rates. Following Lisowy's training sessions, state officials were able to obtain Federal funds to purchase W.I.Z.E. teaching materials for nearly all of Baton Rouge's high schools. This allocation of difficult-to-obtain

funds represents a significant shift of focus and commitment to science education.

The success of W.I.Z.E. in Baton Rouge demonstrates its appeal and adaptability to all kinds of students. W.I.Z.E. has captured the interest of persistently difficult students, and has also inspired advanced biology classes. The kids love it, and the teachers laud it as a revolution in science teaching.

Lisowy's success in Baton Rouge led to an invitation to speak at a conference in New Orleans on women and minorities in science. Much to his surprise, he was named an honorary citizen of the city by its mayor.

On the high school level, where many students only take science as an elective, W.I.Z.E. reaches out to the scientists and conservationists of tomorrow. Don Lisowy, as the Society's education ambassador, is trying to reach as many teachers as he can, today.

Nearly 7,000 of the printed *Self-Guided Tours* launched last year were provided to Zoo visitors between July and October 1989. The first four—Fuzzy Furry Mammals, Animals Families, American Wildlife, and Endangered Species—interpret several animal exhibits along thematic routes through the Zoo. Audience response to questionnaires was most enthusiastic, indicating that the tours helped visitors make better use of their time and increased their concern for conservation. Respondents stated that they were likely to use another self-guided tour on their next Zoo visit. As a result, more are planned for the future.

Pablo Python is a friendly snake who has helped over 6,000 elementary schoolchildren in the New York area appreciate reptiles and other creatures. The Pablo Python program teaches the fundamental observation skills which are the essentials of science inquiry. To enrich the six books in the *Pablo Python Looks at Animals* kit published last year, the Zoo Education Department developed a set of illustrated activity sheets for use in the classroom and on Zoo field trips. The worksheets will reinforce such concepts as animal patterns, textures, sizes, locomotion, feeding, and survival needs. Further plans include a national dissemination similar to that already developed for the Survival Strategies program.

A videotape documentary on the Zoos For Effective Science Teaching (ZEST) program, entitled *A Renaissance in Science Teaching*, was offered free to schools and cultural institutions through a nationwide "800" number service. The tape has been distributed to 142 schools, 35 universities, and 96 zoos and museums in 37 states and the District of Columbia.

The 500-page *ZEST Teachers' Manual*, a compendium of detailed zoo-related lessons edited by educators and scientists over a three-year period, was published this year and is now available to middle school and secondary level teachers and administrators. Requests have been received from many states, and from Canada and the United Kingdom. Its four major sections—Evolution, Ecosystems and Vanishing Species, Physical Adaptations for Survival, and Behavioral Adaptations for Survival—make it an invaluable tool for teaching biological science in

general, and conservation in particular.

During the year, 365,579 students from schools in the tri-state area visited the Zoo, and 44,241 visitors of all ages participated in 1,697 different class sessions taught by Zoo instructors. Some popular programs for adults included N.Y.Z.S. staff lectures on animal-plant interactions by Dr. Mark Wourms; the reproductive behavior of penguins by Dr. Christine Sheppard; conservation of Sumatran rhinos by Curator James Doherty; and wildlife problems in the field by Dr. William B. Karesh. The department also inaugurated a new series for gifted children, ages 5-7 and 8-12, designed to nurture an interest in nature in an atmosphere of intellectual challenge.

In the Children's Zoo a new exhibit of great horned owls gives children an excellent opportunity to observe these predators in their natural environment, where they depend on camouflage for survival. Another new exhibit addresses the question of what kinds of birds make suitable household pets and discourages the purchase of exotic birds such as parrots. On view are several species of hardy, domestically bred pet birds such as: parakeets, canaries, finches, and cockatiels. Some 526,300 visitors enjoyed the Children's Zoo.

In the Wild Asia Children's Theater messages such as why exotic animals, including wild-caught birds, do not make good pets are reinforced. Nearly 35,000 visitors view the show from May-October each year. On the Riding Track, four new camels joined the veterans. Over 84,000 visitors enjoyed this popular educational experience.

Friends of the Zoo (FOZ) continue to enrich the informal educational experience with biofact carts which display curious objects such as rattlesnake skulls, python eggs, owl pellets, and camel saddles. FOZ provided free guided tours to 15,536 children and 2,467 adults, and the FOZ Outreach Program brought tame animals, education, and good cheer to 2,427 adults and 279 children confined to institutions such as nursing homes and hospitals.

Each year over 650 seasonal employees are hired by the Zoo, and for many of the young people it is their first working experience. The Education Department's

audio-visual staff provide training videos to assist the Personnel Department in orientation on the Society's mission and on specific job responsibilities.

#### Aquarium Education

The opening of Discovery Cove encouraged more school districts than ever before to request teacher training at the New York Aquarium. The Education Department conducted 33 Teacher Workshops, several federally funded, reaching 1,484 professionals on the elementary and secondary level.

Over 400 educators, an unprecedented number, including teachers, Day Care directors, and paraprofessionals, participated in Early Childhood Workshops in

**At Discovery Cove, an older student teaches a younger student in the Gallery Guide Program.**





Aquarium docent answers questions at Discovery Cove's salt marsh.

#### Volunteer Victory

Have you ever cracked open an egg and smiled at the sight of two yolks for the price of one? Well, the Aquarium Education Department had the same reaction when it expanded its volunteer program.

In past years about 60 high school students spent summers as guides and interpreters in the major exhibits. Each fall they returned to school. This year, under the direction of Special Projects Coordinator Lee Ann Gast, the program was expanded to become year-round and to include adults. The goal, of course, was to provide enhanced services to the public. The surprise was that the volunteers themselves became a remarkable series of success stories.

Last spring, for the first time ever, Saturday training sessions were held during the school year for adult volunteers. One interested high school student also participated, and was brought to the sessions by his mother. After the first couple of classes, the mother too became a volunteer. And the Aquarium had its first mother-son team.

Similarly, another mother called to inquire about the program for her daughter. The daughter took another job instead, but the mother joined. As Ellie Fries, assistant director of education, puts it, "We got a lot more than we bargained for. The program has helped strengthen ties between parent and child because it's an area of common interest. In some cases the volunteer child becomes the role model for the parent."

"Volunteers," Gast explains, "are living graphics in our exhibits. They are trained in all areas of the Aquarium and then become specialists in some area of interest." Visitors can see how the program works when they are greeted by a volunteer wearing a tee shirt that says, "Whale? Ask me." Here in New York, where some people are not particularly anxious to talk to strangers, the tee shirts are a great ice-breaker. The funniest question asked recently by a child was, "Why do the penguins still have their price tags on?" referring, of course, to the identification tag each one sports on its wings.

Volunteers also help at special events, like openings and membership evenings. They engage the public in story-

telling and puppetry. They make buttons with animal themes. And they teach the Japanese art of fish printing called Gyotaku. Anatomy, biology, survival adaptations, and even consumer questions are just some of the areas explored when realistic models of fish are inked and imprinted onto newsprint paper. Every volunteer is trained to oversee the touch tank in Discovery Cove where, says Fries, "they really contribute to public education. A recent survey showed that 99 percent of adults think that a horseshoe crab stings. It doesn't. This is the sort of thing our volunteers help explain."

Two participants during the past year were students volunteering as part of an internship program. Both attended an alternative high school because they had not done well in a traditional setting. Neither student was particularly social or verbal and, at first, the education staff was not sure about their prospects. But shortly after they began training they experienced a major breakthrough. They simply connected with the animals, and became champions of the whales. Today they are whale experts, skillfully sharing their

expertise with visitors. They are also confident young men with a new-found sense of self-esteem, and well-developed social and verbal skills.

Another participant about which the staff had some doubts was a student in a wheelchair. While the Aquarium was eager to be accommodating, there were concerns about a wheelchair negotiating the exhibits, and also whether fellow volunteers and the public would be accepting. It was decided to assign the young man to the whales, seals, and sharks, because these exhibits are most accessible to a wheelchair. And the young man blossomed. "He did a terrific job with the public," says Fries. "And a comrade developed between him and the other volunteers. He felt needed, useful, and made friends. But it was most rewarding for the staff to see that he opened doors for the other volunteers. It was okay to associate with a handicapped person. They sometimes even hitched a ride on his wheelchair."

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Discovery Cove, where students are encouraged to explore, experiment, and become responsible for the welfare of their marine world. All the educators agree that collaborative programs between schools and cultural institutions help students develop life-long habits in using community resources.

Teaching professionals are trained to maximize the Aquarium experience by integrating marine themes into an interdisciplinary curriculum that includes teaching positive social values, such as reverence for life, and respect for ethnic and cultural diversity. In the Gallery Guide program, now in its fifth year, 25 junior high school students from District #21 in Brooklyn worked at the Aquarium with children with special needs. This unique program was awarded a grant by the Greenwall Foundation and will soon be offered to a second school district in New York City.

Some 36,582 students, from kindergarten through college, attended 969 Education Department programs during the year. Twenty-five future teachers in the Early Childhood Department of Kingsborough Community College were introduced to the Aquarium for training in marine science and museum education. These students, all women and ethnically diverse developed a new appreciation for the importance of their future roles as science educators. The program will be expanded to include teachers on sabbatical leave.

More than 40 volunteers, led by Instructor Robert Cummings, worked with the Department of Environmental Conservation (DEC) during National Coast Week to clean up the Coney Island shore. Networking with agencies such as DEC, Sea Grant, New York State Marine Educators, the Marine Association of Long Island, and others, continues the tradition of involvement in marine related environmental events, and contributes to the formation of City and State policy.

Director of Education Dr. Erwin Ernst established an environmental education program in Honduras and participated in the first International Conference on Conservation Education, held in Caracas, Venezuela, and organized by the Bronx Zoo Education Department. He also brought national prominence to

the Aquarium by serving on a panel to identify Seven Underwater Wonders of the World for future study and for documentation by the Public Broadcasting System.

Dr. Ernst was named 1990 Man of the Year by the *Village Times* of Stony Brook for his 32-year commitment to the Three Village School District of Long Island. Assistant Director of Education Ellie Fries was the 1990 winner of Long Island University's Presidential Award, "In recognition of Outstanding Contributions to Science Education," sponsored by the New York State Marine Educators Association.

LeAnn Gast joined the Education Department as Coordinator of Special Projects. Under her guidance the docent program, now with 100 volunteers, has been expanded to operate on a year-round basis (see story on page 52).

### Central Park Zoo Education

During 1989, the Central Park Zoo Education Department reached a wide range of zoo visitors through a variety of programs. Busy executives learned about penguins, bears, and other animals in mid-week lunchtime lectures. Weekend classes such as "Remarkable Reptiles" and "The Other Panda" introduced families and children to some of the Zoo's unusual inhabitants, while "Zoo 2000" and "Tusks and Trophies" emphasized the need to conserve Earth's vanishing wildlife. More than 700 visitors participated in classes for adults and families, and more than 60,000 schoolchildren visited the Zoo in organized school groups.

Other visitors learned informally from volunteer ZooGuides stationed at various animal exhibits. ZooGuides, who now number 80, also provided information to visitors at Education a la Cart, the Zoo's mobile education center, and in the Wildlife Conservation Center.

The Wildlife Conservation Center was also the location of the new and innovative "Illegal Skin Trade" exhibit, which opened in November 1989. The exhibit focused on the fashion industry's use of skins from endangered and protected reptiles. Lizard shoes, crocodile bags, and scores of other products confiscated by the U.S. Fish and Wildlife Service were on

## ENVIRONMENTAL EDUCATION



Polar bears are one subject of the Central Park Zoo's luncheon lectures.

display, and a companion booklet tells visitors how they can help protect endangered reptiles.

Endangered species, tropical rain forest destruction, and disappearing wildlife habitat were among the issues addressed during the Zoo's Earth Day celebration on April 22, 1990. Instructors and ZooGuides were on hand to answer questions and tell Zoo visitors how to help save wild animals and their habitats.

### Publications

With a new year came a new magazine: *Wildlife Conservation*, launched in January 1990. The title *Animal Kingdom* was retired after nearly a half century of service, mainly because it no longer conveyed the

growing editorial emphasis on conservation that represents the Society's contemporary commitment. The name *Animal Kingdom* suggested stories about pets and barnyard creatures as well as wild animals, and research showed repeatedly that readers wanted more about endangered species. The new, more sharply targeted title also reflects a closer link to the Society's field research division, Wildlife Conservation International. All members of WCI (those contributing \$23 or more) now receive the magazine.

Aside from the name, the most apparent change is *Wildlife Conservation's* more contemporary design: a more liberal use of white space, tints, and accent colors; an expanded variety of typefaces; and the use of unorthodox spaces and shapes. While the editors have not forsaken scientist-authors—especially those affiliated with WCI—the editorial perspective has been broadened with the addition of some of America's finest environmental and wildlife journalists. A new "News" section that includes six or eight short departments (such as "Conservation Hotline," "Elephant Watch," "Zoo World," and "Grassroots Action") has been especially popular. Sidebars that enhance the articles, and "how-to-help" boxes offer ways in which readers can play a direct role in conservation.

The new publication has earned kudos from members, subscribers, writers, and editors. Subscribers, surveyed by Mark Clements Research, saying they liked the new title "very much" went from 37 percent in September/October 1989 to 51.3 percent with the first issue of *Wildlife Conservation* (January/February 1990). The 70.8 percent who found the new magazine "very satisfying" overall exceeded the 1987-89 average of 64.5 percent. The "very satisfying" rating rose to 72.8 percent for the March/April issue.

This enthusiastic response was augmented by the magazine's performance in single-copy sales at bookstores and newsstands. The first issue sold nearly 62 percent of the copies distributed. Magazine publishers generally are happy to sell 40 percent.

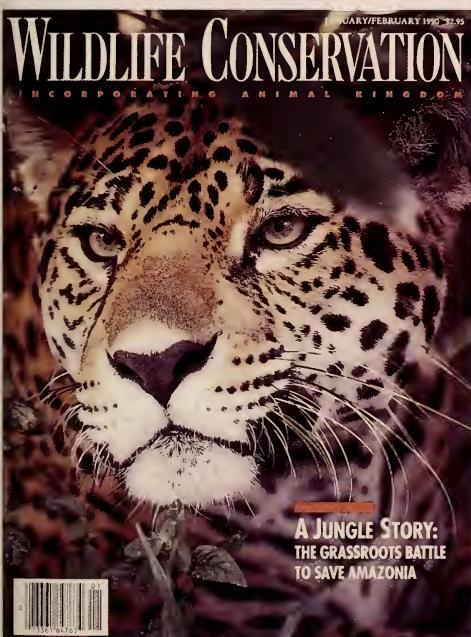
The March/April issue was placed in a special point-of-sale display in every Walden book store in the country. Every copy contains a subscription order card, and, of copies sold this far, 6.9 percent of *Wildlife*

*Conservation* buyers sent in subscription orders. Publishers usually expect a one to two percent return on order cards.

Comments from outside included those of the editor of *International Wildlife*, who wrote, "Not many publications have an underlying vitality these days. Yours does, with plenty to spare." Columnist Michael Wetzel reported in the *Baltimore Sun* and *Chicago Sun Times* that "The content ... demonstrates the magazine's clear commitment to grassroots conservation efforts ..."

While the primary publication was being revamped radically, the department continued to publish *The Bronx Zoo'sPaper*, with modest changes. A "did-you-know?" section, which highlights intriguing facts about animals in the Zoo, was incorporated into the map-related information about facilities and services. The

*Wildlife Conservation's* first issue.



*Zoo'sPaper* is now printed on recycled paper as a further demonstration of NYZS's conservation commitment.

For those who may wonder why the magazine is not on recycled paper, there are two overwhelming reasons: 1) There is no magazine paper stock available with a level of quality that is acceptable for this type of publication and 2) The additional cost of the best of an inferior lot is astronomical. If the industry produces an affordable recycled paper of acceptable quality, it will be considered. In the meantime, some portion of the magazine may be printed on recycled stock.

Photo Services spent much of its time in the refurbished Elephant House, now known as the Keith W. Johnson Zoo Center. A great deal of film was devoted to baby elephant Samuel R., the newly arrived Sumatran rhino Rapunzel, the larger-than-life bronze rhino sculptures in the garden, and Zoo Center exhibits in general. Photographers Bill Meng and Dennis DeMello also concentrated on the construction of Baboon Reserve and African Market, and shot many pictures of the geladas and ibex in their new naturalistic home prior to the public opening. Computerization of the photo files continued, and more than 4,500 pictures were added.

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# SUPPORT SERVICES

Operating the Society's six divisions requires a complex administrative and service infrastructure, staffed by carpenters and monorail drivers, fund-raisers and writers, cooks and personnel officers. They serve nearly four million visitors each year; raise financial support through visitor services, private contributions, and government funding; hire and attend to the needs of the Society's staff; and keep the Society's various physical plants running smoothly. Their collective role is to make the most of the Society's unique resources, through advertising and publicity, membership benefits and public amenities, efficient management and budgetary oversight. They are the essential conduits of logistic and public support for the Society's scientific, conservation, and education functions in New York and around the world.

## SUPPORT SERVICES



### Public Affairs

Signs of a major effort to enhance public and private support for the Society were apparent in every division of Public Affairs, many of them centered on conservation efforts at home and abroad. The groundwork was laid for a critical new capital campaign. The Sponsor-a-Species program, which directly involves donors in saving endangered species, was successfully launched. Several special events were staged around Earth Day and Conservation Week at the zoos and aquarium. And plans for a Society-wide marketing strategy and corporate sponsorship were well underway.

In its early stages, the Capital Campaign now totals about \$14 million in payments and pledges. Several gifts during the year were directed to the Crisis Fund for Vanishing Wildlife, for park protection and elephant survival, including \$1 million from Mr. and Mrs. Gordon B. Pattee and Anne Pattee, \$250,000 from The Prospect Hill Foundation, and \$150,000 from Bradley Goldberg. ITT gave \$1 million, half of it for the Bronx

### Celebrating Mother's Day at the Bronx Zoo with Grandmother Earth.

Zoo's new Baboon Reserve. The Women's Committee raised \$170,000 for the Zoo's planned Great Gorilla Forest and Mrs. L. Emery Katzenbach provided \$500,000 for a new suite for biotelemetry research and operating support at the Animal Health Center. Part of Edith McBean's gift of \$375,000 will help fund Sea Cliffs at the Aquarium. Other gifts to the overall campaign included \$752,575 from The Schiff Foundation, a major contribution from The Irwin Family and Hillside Capital, Inc., \$175,000 from Guy Cary, and \$150,000 each from Mr. and Mrs. Edgar Cullman and C. Sims Farr.

Budgetary funds raised for zoo and aquarium operations totaled \$3,084,024. Individuals gave \$608,151 in a variety of ways. The recently established Animal Kingdom Club, with annual giving categories ranging from \$5,000 to \$25,000 and more, included 115 donors.

In the lifetime categories, three new entries were added to the Best Friends (cumulative gifts of \$1 million and more): Mr. and Mrs. Gordon B. Pattee and Anne Pattee, Mr. and Mrs. David T. Schiff and Mr. and Mrs. Peter Schiff, and Mr. and Mrs. Rand V. Araskog. The six new Benefactors (\$250,000 to \$999,999) are Mr. and Mrs. Frederick Beinecke, Guy Cary, Mr. and Mrs. Edgar Cullman, Mrs. Landon K. Thorne, Mr. and Mrs. Bradley Goldberg, and Mr. and Mrs. Martin Lipton.

Bequests from the estates of Helen Weeks, Mathilde Feuereisen, George Hopp, Leland Shafer, Dora Dennis, and six others came to \$165,625. The more than \$400,000 invested in the NYZS Pooled Income Fund returned better than seven percent to the participants.

The Sponsor-a-Species program was introduced in January and enlisted 43 donors for a total of \$43,832 by year's end. Much of the credit for this initial success goes to Alison Stern, who, with her husband Leonard Stern, hosted a dinner at the Central Park Zoo featuring the new program. The appeal reached new and enthusiastic audiences, among them the fourth grade at the Collegiate School in Manhattan, which raised money to sponsor the Mongolian wild horse and the small-clawed otter (see story on page 62), and the Bellport Middle School in Long Island, which raised funds in conjunction with Earth Day to sponsor the Grevy's zebra.

Foundation support came to \$1,891,750. The Edward John Noble Foundation provided \$312,000 in support for the Wildlife Survival Center on St. Catherines Island. Bronx Zoo Education received \$250,000 for its Teacher Training program from The Charles Zarkin Memorial Foundation, \$160,000 for Children's Zoo renovation from the Charles Hayden Foundation, \$25,000 from the Samuel and May Rudin Foundation for AfricaLab materials, and \$25,000 each from The Louis Calder Foundation and The Charles A. Dana Foundation for general educational purposes. Animal Health was supported by a \$150,000 grant from The Perkin Fund for the nutrition program, \$50,000 from the Marilyn M. Simpson Charitable Trust toward the Marilyn M. Simpson Charitable Trust Endowment for wild animal health and welfare, and part of the F.M. Kirby Foundation's gift of \$30,000. Other foundation donations included \$50,000 from The Helen Clay Frick Foundation for the Bronx Zoo and New York Aquarium, \$35,000 over three years from the Dewitt Wallace-Reader's Digest Fund for the Summer Employment Training Program, \$20,000 from the Keith Wold Johnson Charitable Trust toward the Sumatran

**Young NYZS member meets iguana  
at the Society's annual meeting.**





Collegiate School students and teachers present a check to Fran Sheeley to Sponsor-A-Species.

#### **Quilting For Conservation**

*Who could predict that quilts made in New York City would keep a horse and an otter warm?*

*Every year the fourth grade at the all-boys Collegiate School studies geography. This year, each student was assigned a state, and each was required to create a square. to be joined together in two large quilts. It was quite a task, but they did it, and in the end they had created two beautiful examples of American folk art. Each boy wanted to take one home, but they seemed like the sorts of things that could be used to raise money for a good cause. So, what to do? It was decided to raffle them off.*

*There were many suggestions about where the money should go, all reflecting the increasing awareness and sobering sensitivity of young people toward the world's problems. Fourth grade teacher Elizabeth Abbe says that reports of oil spills, in Alaska and around the world, raised the boys' consciousness about damage being done to wildlife and the environment. A call was made to the New York*

*Zoological Society, and Director of Planned Giving Fran Sheeley suggested that the fourth grade sponsor a species.*

*The Sponsor-A-Species program is designed to help ensure the survival of endangered species. It provides financial support for the breeding programs, research, and educational services conducted by the Society in the interest of endangered animals. More than 20 different kinds of animals, all of which are represented at the Zoos and Aquarium, can be sponsored for sums ranging from \$250 to \$5,000.*

*Tickets were sold, the quilts were raffled off, and all together the fourth grade raised \$781.65 - enough to sponsor the Przewalski's horse and the Asian small-clawed otter as well. "The boys really felt proud of themselves," says Abbe. "They made these very beautiful quilts, and they raised all this money for a cause they really believe in." The check was presented to Sheeley at a school assembly where teachers Elizabeth Abbe and Ray Chambers, and all the students in the fourth grade, proudly showed off their quilts and planned visits to the Bronx Zoo to see their sponsored species.*

rhino, and \$25,000 each from the Scherman Foundation and the G. Unger Vetlesen Foundation for general support.

Corporate contributions totaled \$1,145,100 under the leadership of the Business Committee and its chairman, Richard A. Voell. Major gifts were received from The Bristol-Myers Fund, Inc., The Chase Manhattan Bank, N.A., CITIBANK, the Liz Claiborne Foundation, Coca-Cola USA, Consolidated Edison Company of New York, Inc., The Hoffmann-La Roche Foundation, KPMG Peat Marwick, The New York Times Company Foundation, Inc., and The Rockefeller Group, in addition to corporate contributions to WCI and significant gifts-in-kind from General Motors Corporation, Great Bear Natural Springs Water Company, and Philip Morris Companies, Inc.

Nearly \$170,000 was raised by the third annual Corporate Benefit, co-chaired this year by Richard E. Snyder, Gayfryd Steinberg, and Joan Tisch. Held at the Central Park Zoo on June 7, 1990, the event honored Richard Voell with the Society's Distinguished Leadership Award. Other events included Corporate Donor Weekends, which attracted 10,000 participating corporate employees. On these weekends, employees of members belonging to the Corporate Benefits Plan are admitted free to the Bronx Zoo, New York Aquarium, and Central Park Zoo.

Contributions to Wildlife Conservation International totaled \$2,541,135, including outstanding grants of \$200,000 from the Robert Wood Johnson Charitable Trust, divided between the WCI okapi project in Zaire and general conservation needs; \$100,000 from the Helen C. and Robert T. Kleberg Foundation for the field projects of George Schaller, David Western, Archie Carr III, Stuart Strahl, and William Weber; and \$280,000 in renewed support from the Pew Charitable Trusts for training conservation professionals in developing nations.

Core support for WCI projects in Patagonia, Argentina was once again provided by the Nixon Griffis Fund, a major foundation continued its "Women in Conservation" program by awarding funds to WCI Research Fellow Elizabeth Bennett in Malaysia. The W. Alton Jones Foundation backed WCI's projects in the



**Mrs. Joyce Dinkins, her grandson Jamal, and Atchade Denis Assongba helped open the new Baboon Reserve and African Market.**

rain forests of Borneo and the Jessie Smith Noyes Foundation again provided leading support for the program directed by Stuart Strahl in tropical South America, as did the Atholl-McBean Foundation.

Direct-mail and special appeals to individuals raised almost \$1 million, focusing on elephant conservation and WCI's leadership efforts in banning the global ivory trade, as well as rain forest conservation. An appeal in May highlighted the vast Chang Tang reserve in northwestern Tibet that George Schaller is working to establish.

Overall, 22,093 new WCI supporters were added from all 50 states, an increase of 50 percent over last year. 95 Friends of WCI contributed gifts of \$2,500 or more, and the William Beebe Fellows increased by four to 41 donors of \$10,000 or more. Notable gifts

were also received from Heidi Nitze, Joseph Cullinan III, Betty Wold Johnson and Douglas Bushnell, Margot Marsh, Noel Rowe, and the Vanderbilt Trust.

Prominent corporate support for WCI was received from Mill Pond Press, American Hawaii Cruises, Schostak Brothers & Company, Inc., and the Ogilvy Foundation. Gifts from eighteen fashion industry leaders, spearheaded by Liz Claiborne, totaled \$114,000 to underwrite an advertising campaign on the elephant ivory ban. In addition, the Liz Claiborne/Art Ortenberg Foundation provided critical grants for George Schaller's work in Tibet.

Membership in the New York Zoological Society reached 34,064 at the end of fiscal year 1990. Revenues from membership totaled \$1,899,193. Members and other donors also contributed more than \$216,000 to two direct-mail appeals, and more than \$80,000 was received in corporate matching gifts. Member's activities included the traditional annual cleanups at the Bronx Zoo and Central Park Zoo,

## SUPPORT SERVICES

which drew 300 volunteers despite rainy weather. Capacity crowds attended both sessions of the 96th annual member's meeting at Avery Fisher Hall in February, which focused on "the hidden life of the Society in the year of the elephant." More than 11,000 people attended Members' Evenings at the Bronx Zoo and Central Park Zoo and Members' Mornings at the New York Aquarium. And 198 members participated in the Society's travel program, which included birdwatching in Jamaica Bay, whalewatching off Cape Cod, a sail around New York Harbor in the sloop Clearwater, and trips to Alaska and Patagonia, where they helped WCI Research Fellow Dee Boersma band penguins.

Annual Patron members now number 354, under the leadership of Trustee John Elliott, Jr. and John Chancellor. Several Patrons visited the Wildlife Survival Center on St. Catherines Island in April. In addition to their annual dues of \$1,000, Patrons contributed over \$400,000 to NYZS projects, and \$270,000 to WCI.

The dawn of "The Decade of the Environment" brought new focus and energy to the Society's Marketing and Communications efforts. An advertising campaign based on market research conducted last year at the Bronx Zoo resulted in more highly targeted and compelling advertising messages in this year's campaign. Zoogoers were encouraged to return for several visits. After all, the copy said, "You can't see the world in a day." Strong graphics in outdoor advertising, featuring the striking and colorful hoatzin, crisply edited animal footage combined with high-tech computer graphics for television, and engaging, informative, and humorous readings on radio generated considerable impact within limited budgets for the Zoo and Aquarium.

Several special occasions enjoyed widespread media coverage. From the thirteen TV crews that showed up for the opening of the Keith W. Johnson Zoo Center to the shower of paparazzi for the debut of Rapunzel, the rare Sumatran, or hairy rhino, Zoo and Aquarium events garnered millions of impressions in print and electronic media. Other stories kept the Zoo and Aquarium before the public: the Pelican Round-up in

the fall, the debut of Zoo Babies in the spring, the gift of new lion cubs by popular singer Whitney Houston, groundbreaking ceremonies for the Aquarium's Sea Cliffs and the Prospect Park Zoo renovation, Brooke Shields' *Cosmopolitan* Bronx Zoo feature, and even a Bronx Zoo cover for ITT's annual report.

WCI's African Elephant Survival Campaign and the ultimately successful effort to have the African elephant upgraded to Appendix I of the Convention on International Trade in Endangered Species (CITES), involved several highly effective ads and extensive news coverage. Liz Claiborne's print ad against buying ivory, signed by prominent leaders in the fashion industry, George Plimpton's radio plea for listener contributions, and Glenn Close's radio, TV, and print ads all had an international impact, on the public as well as the voting members of CITES. WCI scientists were also featured in a prestigious and fully subscribed lecture series at the American Museum of Natural History, and George Schaller's epochal work to establish the world's largest wildlife reserve in Tibet received broad attention in the press.

Plans to translate all this visibility and goodwill for NYZS programs into additional support began to take shape in the form of an energetic new marketing campaign that will include licensing and corporate sponsorship. A major example of corporate involvement was the Kal Kan division of M & M/Mars Company's sponsorship of special entertainment and educational events at the Bronx Zoo on Earth Day and the following seven weekends. The Corporate Entertainment Program realized \$80,375 in donations for 13 events at the Bronx Zoo and Central Park Zoo.

### **Administrative Services**

Attendance rose eight percent at the Bronx Zoo to 2,117,537 and six percent at the New York Aquarium to 751,133 for the fiscal year. The Central Park Zoo admitted 887,279 people. Transportation systems at the Bronx Zoo—Bengali Express, Zoo Shuttle, and Skyfari—carried 1,521,497 people, an eleven percent increase over last year, and more than 523,000 people visited JungleWorld.

Group Sales generated new target markets for



The gift shop at African Market offers arts and crafts from Africa.

organized group visitation at the Bronx Zoo through continued and new affiliations with various travel and tour organizations. Manager of Groups Sales Margaret Price was designated Certified Tour Professional (CTP) by the National Tour Foundation, which should facilitate the exploitation of national markets.

As the construction of Sea Cliffs got underway at the Aquarium, the Restaurant and Merchandise Department focused on planning the new gift shop that is scheduled to open next year. The shop will incorporate as its back wall a window revealing the Beluga whale tank.

Food and merchandise facilities being completed as part of the Bronx Zoo's new Baboon Reserve and

African Market included several buildings in a West African style of architecture. The merchandise outlet was to be stocked with animal carvings, tribal masks, handcrafted baskets, jewelry, and other African items.

Full-time employment encompassing all six NYZS divisions increased from 605 to 620 during the year. Another 600 employees, mostly teenagers from the Bronx, were hired for the summer season.

The Personnel Department has continued to develop its Seasonal Training and Employment Program (STEP), supported by a three-year grant from the DeWitt Wallace-Reader's Digest Fund. A STEP videotape produced by the Zoo Education Department's Audio-Visual Services is now used to help orient all new seasonal employees. By developing stronger ties with local schools and community-based organizations, the department is seeking to strengthen its future full-time and seasonal work force.

### Bronx Zoo: Media Mecca

As the zoo community becomes increasingly dedicated to saving nature and promoting conservation, the media have also become aware of public interest in things natural and wild. During the past several years the Bronx Zoo has been a mecca for television producers, newspaper reporters, and magazine editors. Their concern is capturing the public's interest. Saving wildlife and wild places fits the bill, and the New York Zoological Society takes top billing.

During the past year the Society's public relations staff fielded more than 800 press inquiries and coordinated 300 press visits. Two national television programs broadcast live from the Bronx. NBC's *Today Show* reached an audience of 5.5 million people with an in-depth live broadcast on the Bronx Zoo as a tourist destination. Nine Broadcast Plaza, a midday news and information program on Universal Nine's superstation, spent two hours broadcasting live to 202,000 people from JungleWorld on

**Whitney Houston and students from the Franklin School in East Orange, N.J. at the lion cubs' debut.**

### Earth Day.

Other media coverage ran the gamut from very scientific to celebrity popular. Cable News Network, seen worldwide by 56 million households, came to interview NYZS General Director William Conway on the American Association of Zoological Parks and Aquariums' (AAZPA) Species Survival Plan. This comprehensive program consists of breeding plans for selected endangered species. The Society participates in an impressive 70 percent of the plans. *Entertainment Tonight*, syndicated to an audience of 1.5 million households, did a story on entertainer Whitney Houston, who donated funds for two lion cubs. Financial News Network interviewed Director Conway on the economics of zoos.

Rapunzel, the rescued rhino from Sumatra, was featured in the *New York Times* and *New York magazine*, but the U.S. media are not alone in their interest in the Society. *Der Spiegel*, Germany's leading weekly news magazine, focused on the Society in a story on endangered species. France's *Le Figaro* newspaper spotlighted JungleWorld in a photo essay.

A high level of interest in the Zoo and the Society's good



**Brooke Shields with Supervisor Mike Tiren (right) and Keepers Frank Leonard and Marcy Farley.**

work promises to continue into the coming year. Already scheduled are a comprehensive tour for the science staff of *Time magazine* and an in-depth profile of zoos on *Infinite Voyage's* program

called "Keepers of Eden," to air in the fall of 1990.





### **Operations — Construction and Maintenance**

Immediately following the grand opening of the Keith W. Johnson Zoo Center last summer, the Zoo's contractors and staff moved on to the Baboon Reserve and African Market construction site. Contractors for Phase I, the City-funded portion, had completed the earthmoving, water moats, utility infrastructure, and animal management facility. Phase II, the Society-funded portion, including the detailed exhibit work and African Market buildings, began in July 1989 and continued throughout the winter despite the weather. The five-acre animal habitat and public area was virtually complete by the beginning of summer 1990.

Adjacent to African Market, and also with City funding, the existing African Plains Lion Island and Nyala exhibit was restored by dredging barrier moats, reshaping eroded contours, and putting in new plantings and public fencing. Fifty years ago, African Plains helped advance the development of natural habitat exhibits at zoos in the U.S. and around the world.

Other City-funded projects included the sealing of the newly paved Crotona and Wild Asia parking lots, and the reconstruction of the Holarctic Tarn Pond in the North America area of the Zoo. Dredging will

Bronze casts of Katherine Weems' rhino sculptures joined the live elephants and rhinos at Zoo Center in October 1989.

increase water depth, and an artificial beaver dam and new landscaping will be added.

City funds were allocated for a feasibility study on relocating the Zoo's many service facilities to a new center on the Zoo's periphery. Future City projects include the conversion of the old Bird House on Astor Court into an administrative office building. The plan and specifications for this project are nearly complete, with a construction start date scheduled for late fall of 1990. The City is also bidding to replace equipment for the Zoo's Maintenance Department, including a backhoe, street flusher, garbage truck, and rack-body truck.

The Cogeneration Project is in its final test phase. The plant should be in full operation in fall 1990, generating electricity and providing thermal energy for the Zoo.

In the Aquatic Bird House, local contractors and Zoo construction staff modified the existing area for a new exhibit of South American hoatzins. Improvements were also made in the World of Darkness and in Visitor Transportation Services.

## REPORT OF THE TREASURER

Hard times continued during the fiscal year ending June 30, 1990, as expenditures for general purposes of \$48,039,127 exceeded revenues by \$1,661,469. Costs rose eight percent, despite concerted efforts to curtail their growth.

### **General Operating Support and Revenue**

Contributed support of \$5,640,147 from individuals, foundations, and corporations provided 12 percent of the operating budget. Income from the Lila Acheson Wallace Fund, established through the generosity of the late Mr. and Mrs. DeWitt Wallace, long-time supporters of the Society, provided \$400,000.

Government support increased 11 percent to \$15,344,161 and provided one-third of operating funds, in line with previous years. The City of New York's Department of Cultural Affairs supplied \$9,779,472 for Bronx Zoo and New York Aquarium operations. The Central Park Zoo received \$2,694,689 from the City's Department of Parks and Recreation. State of New York funding, through the Natural Heritage Trust, remained level at \$2,138,861. Federal funding increased to \$731,139. Additional National Science Foundation support for Bronx Zoo Education Department programs and United States Agency for International Development funding for Wildlife Conservation International projects accounted for this increase.

Admissions revenue improved with increases in attendance at the Bronx Zoo and New York Aquarium; attendance at the Central Park Zoo decreased in line with budget expectations to 75 percent of the previous year's level. This is consonant with the experience of other newly opened zoos throughout the country.

The Bronx Zoo's free admission policy for Tuesdays, Wednesdays, and Thursdays applied to 57 percent of its visitors.

Although Guest Services revenues increased modestly to \$8,506,594, margins improved 20 percent compared to the previous year (a poor

one). Improved seasonal labor utilization and product selection contributed significantly in this area.

Membership and *Wildlife Conservation* magazine revenues remained level while Zoo Education Department revenues increased ten percent to \$423,855.

### **General Operating Expenses**

Personnel services, including payroll taxes and fringe benefits, accounted for 56 percent (\$27,135,765) of operating expenditures. Wildlife Conservation International grants to 120 field researchers increased by more than \$400,000 to \$2,707,856.

Utility expenses increased about \$250,000 to \$1,997,301. An expanded *Wildlife Conservation* magazine's production costs grew by \$200,000 to \$1,297,979.

Many costs were held level, including animal food and forage, general liability insurance, and advertising.

### **Capital Improvements and Collection Accessions**

Expenditures in capital improvements and accessions were \$12,885,611, including \$8,972,135 at the Bronx Zoo, \$3,521,045 at the New York Aquarium, and \$392,431 on the City Zoos Project.

Contributed support for capital improvements was \$3,477,960. Investment activity related to these funds, pending disbursement, provided an additional \$1,938,904, and collection deaccessions \$20,132. These funds were complemented by \$3,213,662 provided by the City of New York for capital improvements at the Bronx Zoo and New York Aquarium. Society reserves contributed \$4,234,953 to complete necessary capital funding.

At the Bronx Zoo, the Keith W. Johnson Zoo Center (Elephant House) was opened in July 1989, and the Baboon Reserve-African Market and Cogeneration and District Heating System were near completion by the end of the fiscal year. At the

Aquarium, the construction phase of the Sea Cliffs exhibition began. Construction continued on the Flushing Meadows Zoo and began on the Prospect Park Zoo, as mandated by the City.

The Society acquired nine units to provide temporary housing for staff recruited from out of town. The new housing will enable the Society to attract qualified individuals who might otherwise be discouraged by New York relocation costs.

#### **Endowment Funds**

The market value of endowment funds at June 30, 1990 was \$86.7 million, of which 63 percent was invested in equities. During the year these funds provided \$4.3 million in operating support.

<b>Income designated for</b>	<b>Market value (in millions)</b>
General	\$45.9
Wildlife Conservation International	23.5
Bronx Zoo	14.1
New York Aquarium	3.2
	<b>\$86.7</b>
	<b>=====</b>

Equity account indexes continue to rank the Society's portfolio performance in the top decile of similar tax-exempt funds. Annualized performance was 7.5 percent for the twelve months ended June 30, 1990.

#### **Outlook**

As to the future, a somewhat bleaker outlook for both the City and the State gives us real cause for concern. While dealing with living collections, belt-tightening is a particularly arduous task; needless to say, we shall have no choice but to address budgetary constraints as they arise.

David T. Schiff, Treasurer

#### **Operating Revenue and Expenditures (Year ended June 30, 1990)**

Operating Support and Revenue	
Contributed support	\$5,640,147
Grant from supporting organization	400,000
Government support	15,344,161
Admission fees	5,655,548
Exhibit admissions	2,985,850
Membership	1,899,193
Endowment and other investment income	4,323,046
Publications	901,536
Education programs revenue	423,855
Miscellaneous	<u>297,728</u>
Subtotal	37,871,064
Guest Services	<u>8,506,594</u>
Total operating support and revenue	<u>46,377,658</u>

#### **Expenditures**

Program services	
Bronx Zoo	21,560,629
Aquarium	5,187,498
City Zoos	3,500,684
Wildlife Conservation International	4,095,656
Survival Center	367,869
Publications	1,297,979
Membership	<u>954,343</u>
Total program services	<u>36,964,658</u>
Supporting services	
Management and general	3,519,103
Fund raising	<u>2,472,181</u>
Total supporting services	<u>5,991,284</u>
Guest Services	<u>5,083,185</u>
Total expenditures	<u>48,039,127</u>
Excess of expenditures over operating support and revenue	<u>\$1,661,469</u>

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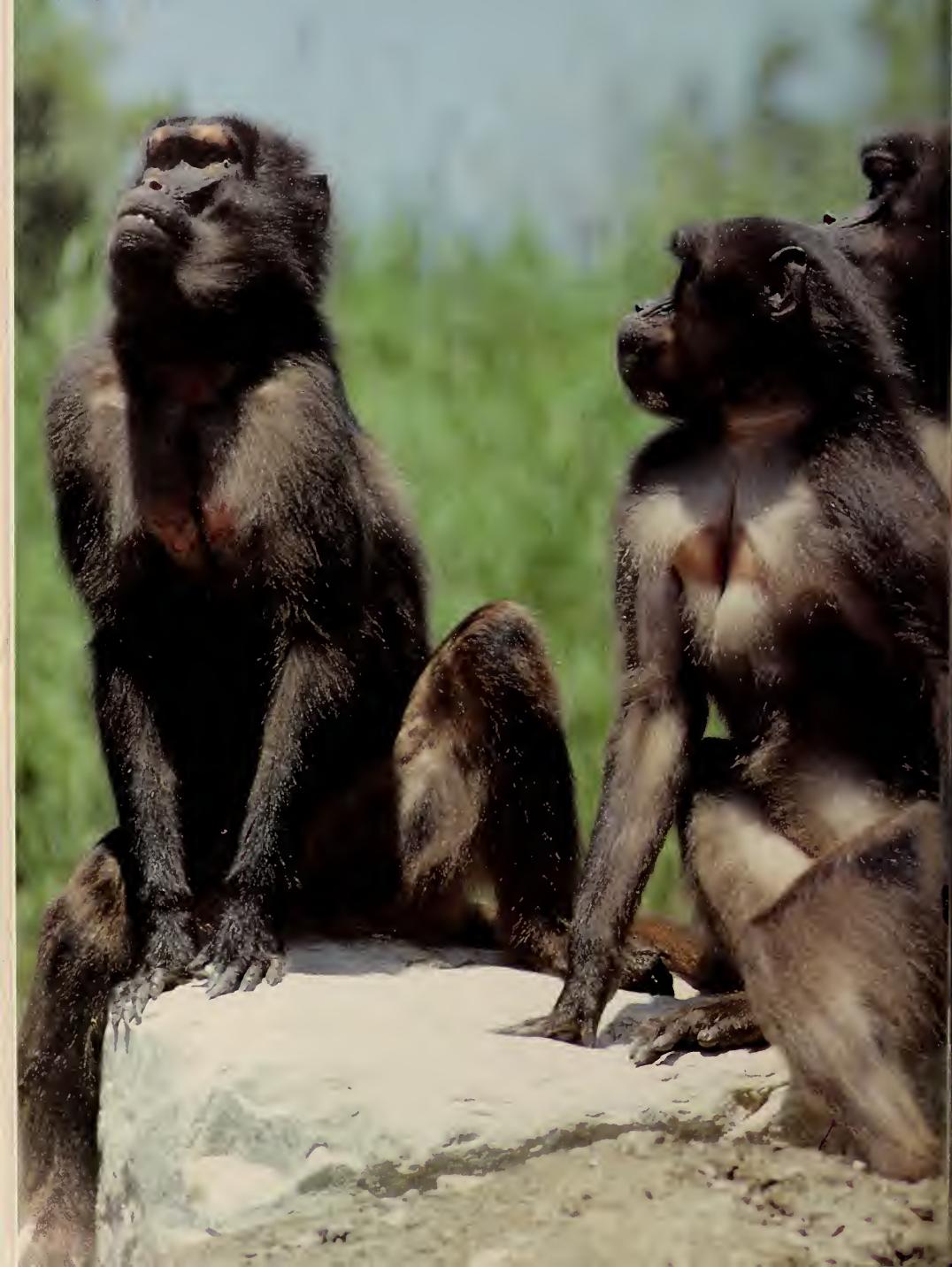
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Left: Tuss and Samuel R.  
at Zoo Center.

Page 80: Geladas at  
Baboon Reserve.

Back cover: Teaching at  
Discovery Cove.





**Recommended Form of  
Bequest**

The Trustees of the Society recommend that for estate planning purposes, members and friends consider the following language for use in their wills: "To the New York Zoological Society, a not-for-profit, tax-exempt membership organization incorporated in the State of New York in 1895, having as its principal address the New York Zoological Park, Bronx, New York 10460, I hereby give and bequeath \$25,000 for the Society's general purposes."

In order to help the Society avoid future administration costs, it is suggested that the following paragraph be added to any restrictions that are imposed on a bequest: "If at some future time, in the judgment of the Trustees of the New York Zoological Society, it is no longer practical to use the income or principal of this bequest for the purposes intended, the Trustees have the right to use the income or principal for whatever purposes they deem necessary and most closely in accord with the intent described herein."

If you wish to discuss the language of your bequest with a member of the Society's staff, please be in touch with the President's office (212) 220-5115.

Howard Phipps, Jr., President





